Chemical Week

September 17, 1955
IN TWO PARTS • PART ONE

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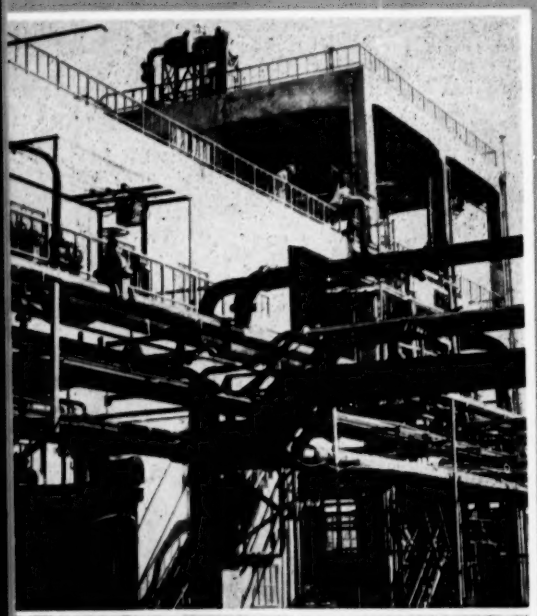

Will the AFL-CIO merger bring peace for plant workers? . . p. 18

U. S. chemical firms have a big stake in Japanese industry; here's a complete picture . . . . . p. 31

Key to Harrisons & Crosfield's steady growth: it's a distributor with a difference . . . . . p. 49

Automatic plants are great when they work, but they can get out of order; here's how CIL 'doctors' ailing controls . . . . . p. 77

Don't worry about overcapacity for antibiotics output; greater use will take up the slack . . . p. 97

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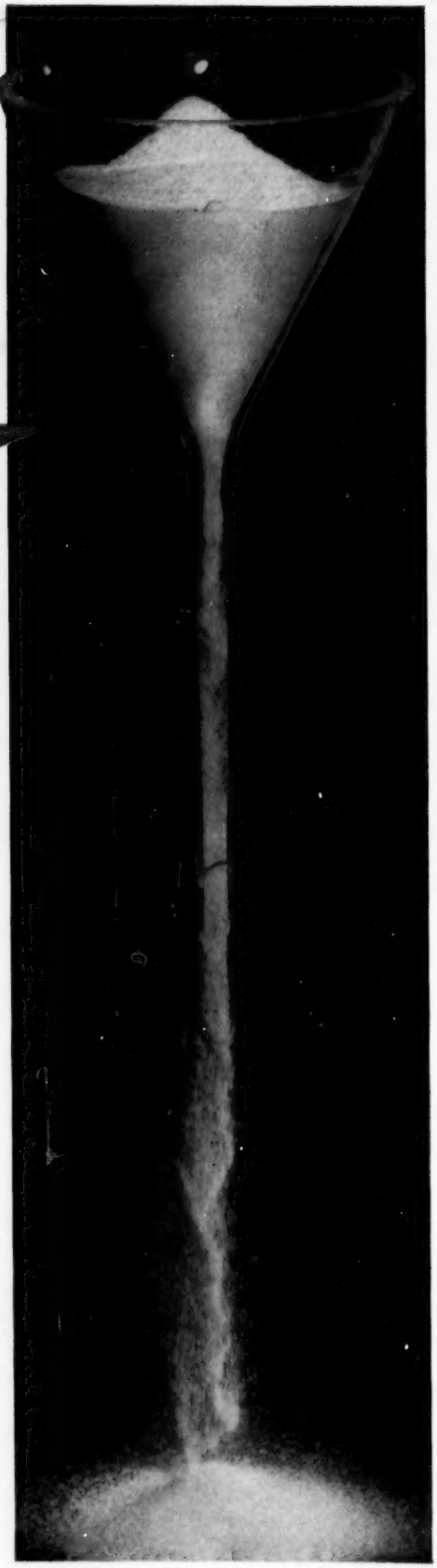

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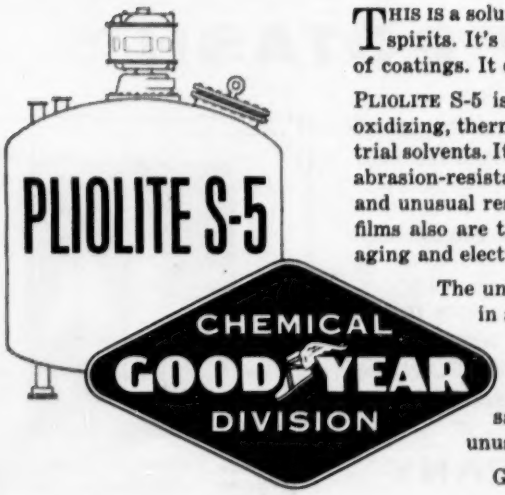

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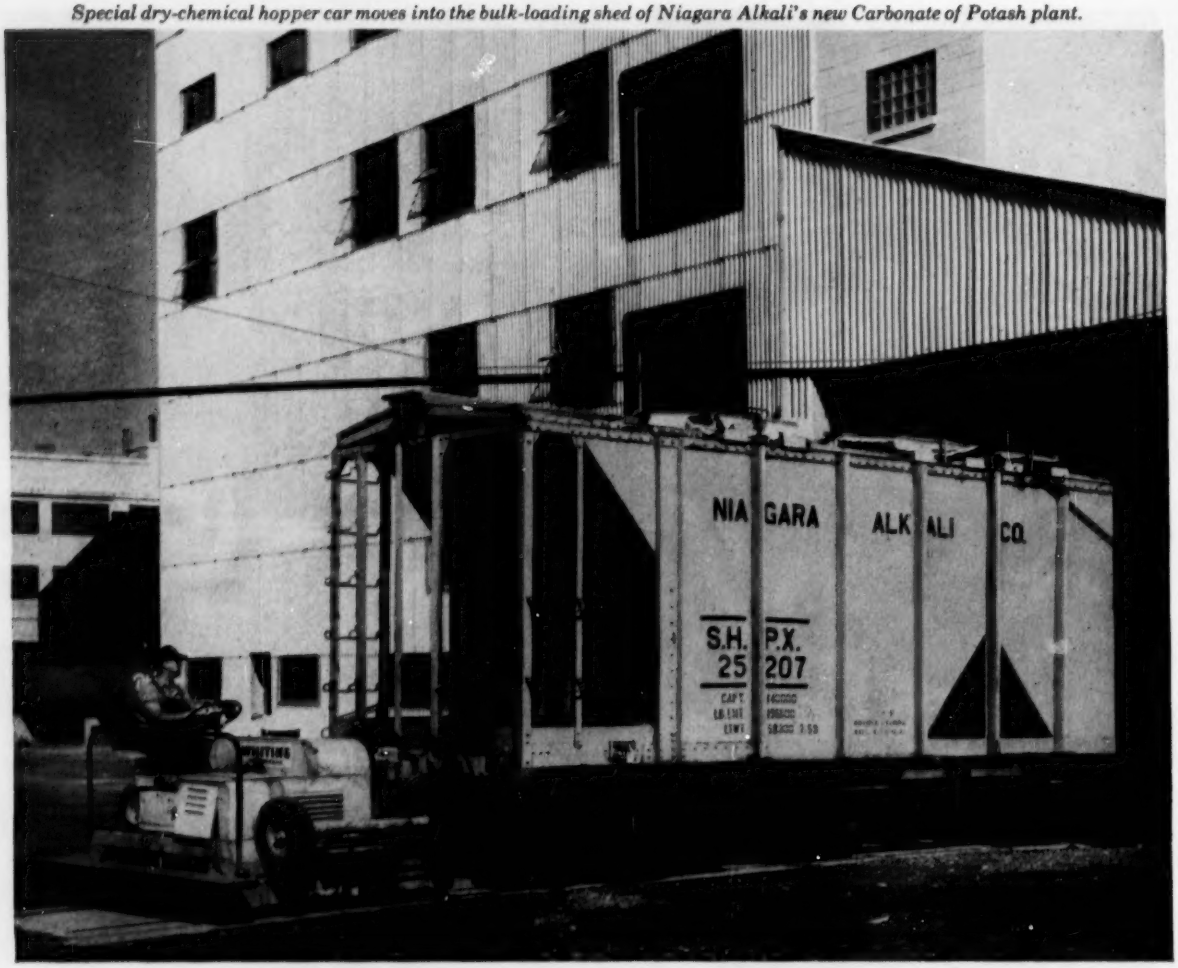

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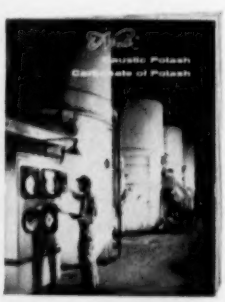

Send for free illustrated booklet, NIALK CAUSTIC POTASH, CARBONATE OF POTASH *containing valuable data on the use and handling of these chemicals.*

Chemical Week

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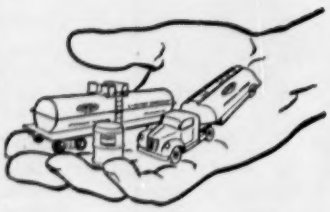
USEFUL INFORMATION ABOUT REACTIVE CHEMICALS FROM DU PONT ELECTROCHEMICALS DEPARTMENT

Hydrogen Peroxide Widely Used in Industry and Chemistry



"Albone," an aqueous hydrogen peroxide solution, is available in grades containing 35% and 50% by weight H_2O_2. It is water-white, extremely stable, and contains no organic stabilizers.

The most outstanding property of hydrogen peroxide is its oxidizing action on both organic and inorganic materials. A particular advantage of this oxidizing action is that no undesirable by-products are formed, since water is the only residue.

Widely used in bleaching textile fibers, wood pulp, fats and oils, wood, etc., it is also a versatile reagent in a large number of chemical reactions.

Under proper conditions, "Albone" oxidizes ferrous iron to ferric iron, nitrites to nitrates, sulfides and sulfites to sulfates, halogen acids to the corresponding halogens (except fluorine), and alcohols and aldehydes to the organic acids or even to carbon dioxide in the presence of certain catalysts. Organic peracids result from the reaction of peroxide with the corresponding acid anhydride.

In contrast to its oxidizing properties, "Albone" has a strong reducing action under some conditions. It reduces cupric salts, silver and gold oxides, vanadic acid, periodates, bromates, and permanganates, generally with a liberation of oxygen.

"Albone," under certain conditions, adds on to ethylenic hydrocarbons to form glycols. With many inorganic oxides and hydroxides, it forms the corresponding peroxides. Most hydrate-forming salts produce perhydrates with hydrogen peroxide. Organic chlorides form organic peroxides, i.e., benzoyl peroxide from benzoyl chloride in an alkaline peroxide medium.

Hydrogen peroxide can be used in acid, neutral, or alkaline solutions. The rate of reaction can be controlled and directed by proper selection of pH, total alkalinity, catalyst, temperature, and concentration.

For more information about properties and applications, send the coupon below.

"Elvanol" Helps Make Stable Emulsions

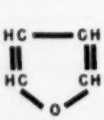
Just a small amount of "Elvanol" polyvinyl alcohol is all that's needed to make highly stable dispersions or emulsions of mineral and vegetable oils, many resins, waxes, organic solvents, etc. It functions as a protective colloid and surface agent which lowers interfacial tension—thus making emulsions which are resistant to creaming and phase separation. Because it is non-ionic "Elvanol" can be used in acid or alkaline media. In some applications, "Elvanol" serves as a binder and thickener as well as an emulsifying agent. High-quality dispersions can be easily prepared in simple equipment. To meet specific requirements several grades of "Elvanol" are available.

Check coupon for more information.

To Introduce Nitrile Group—Use NaCN

The highly versatile nitrile (CN) group is becoming increasingly important in chemical syntheses. It offers a convenient method for adding another carbon atom to an organic compound and makes possible a variety of reactions leading to a host of products, including dyes, pharmaceuticals, fibers and plastics. Quite often, the most practical way to introduce the (CN) group is through the use of high purity NaCN.

Furan Important Intermediate in Organic Synthesis



Physical Properties

Appearance	Colorless liquid
Odor	Mild, pleasant
Molecular Weight	68.07
Boiling Point	31.3°C. at 760 mm.
Specific Gravity, 20/4	0.937
Index of Refraction, n20/D	1.4214
Flash Point	32°F.

Solubility in H_2O : Approx. 1g./100g. H_2O
Miscible with most common organic solvents.

With its conjugated unsaturation, furan has reaction characteristics somewhat similar to divinyl ether and butadiene, but modified by its cyclic structure. Substitutions, additions, and fission of the ring can be effected depending on conditions employed. The following reactions serve to illustrate the versatility of furan:

Chlorination → **Chlorofurans**
Nitration → **Nitrofuran**
Sulfonation → **2-Furan Sulfonic Acid**
Conversion to other Heterocyclic Compounds → **e. g., Thiophene**
Acylation → **Alkyl and Aryl 2-Furyl Ketones**
Acetalization → **2,5-Dialkoxy-2,5-Dihydrofurans**
Diels-Alder Diene Synthesis → **3,6-Endoxytetrahydrophthalic Anhydride**
Metallation → **2-Furyl Sodium**

E. I. du Pont de Nemours & Co. (Inc.)
11507 Nemours Bldg., Wilmington, Del.

Please send me literature and information on: (CW-9)

- ☐ Sodium
- ☐ "Albone" Hydrogen Peroxide
- ☐ "Elvanol" polyvinyl alcohol
- ☐ Furan
- ☐ Pyrrolidine
- ☐ Dihydropyran

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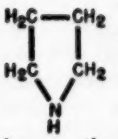
Pyrrolidine



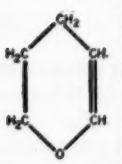
This cyclic secondary amine functions as both a catalyst and reaction intermediate. Unusual compounds can be made by reactions involving addition, condensation, acylation, and alkylation. Highly reactive, this intermediate provides practical routes to useful industrial products, i.e.:

With carbon disulfide, to make *rubber accelerators* similar to those obtained from piperidine.

With alkyl halides, it gives N-alkyl pyrrolidines which can be converted to quaternary bases useful as *sterilizers* and *surfactants*.

Introduction of the pyrrolidyl ring, a physiologically active nucleus found in many natural products such as alkaloids. With ethylene oxide, N-hydroxyethyl pyrrolidine is formed. *Send for Bulletin No.* 28.

Dihydropyran



Colorless liquid.
B.P. ..... 86°C.
Flash point . –18°C.
Solubility in water at 20°C., 3 g./100 g.
Miscible with common organic solvents.

The reactivity of the double bond makes possible a wide variety of addition compounds. Hydrogenation yields tetrahydropyran, an excellent solvent and chemical intermediate. The following reactions suggest applications for dihydropyran as an intermediate:

With Mono- and Polyhydroxy Compounds .. Tetrahydropyryl Ethers
With Hydrogen Bromide 2-Bromotetrahydropyran
Chlorination 2, 3-Dichlorotetrahydropyran
Hydrolysis ..... Deltahydroxyvaleraldehyde

Write for Bulletin No. 18.

OPINION . . . . . .

Sheer Blooper

TO THE EDITOR: We don't mean to be picayune—but what a blooper. . . .

Last week (Sept. 3, p. 80) we read about southpaw Nielsen who climbs glaciers in Alaska and "determines *sheer* modulus, etc." for Monsanto. Maybe Nielsen stumbled on a new gimmick—climbing sheer glaciers—but that's not the way they taught it at Wisconsin.

Or shall we just write it off as *shear* (editorial) exhaustion, or *shear* nonsense—it *was* hot in August.

L. J. BECK
Lawrence J. Beck, Inc.
Hanover, N. J.

It was hot!—ED.

Sweet After-taste

TO THE EDITORS: In your news article on sugar substitutes (*Aug. 20, p. 73*) you say that "Saccharin. . . hasn't gone into many processed foods because of its instability under acid and heat, its tendency to leave a bitter after-taste." Contrary to that statement. . . the Journal of the American Pharmaceutical Assn. states [*J. A. Ph. A.*, XLI, *17 (1952)*] that saccharin is stable under all conditions encountered in ordinary food preparation and processing (pH range 3.3-8, temperatures up to 150 C). Also no loss of sweetening power nor development of off-flavors due to instability has been encountered. . .

The cyclamate off-taste is being subdued by adding saccharin, according to your own article. Saccharin off-taste is not detectable to 90% of panel tasters when used at food-level concentrations, according to an article by Abbott scientists in the Journal of the American Pharamaceutical Assn. for June, 1955, p. 353 . . . .

ROBERT W. RADUE
Group Leader, Saccharin Research
Monsanto Chemical Co.
St. Louis, Mo.

Perhaps we might have added this: Years ago, when saccharin was the sole threat to sugar, some legislators, imbued with a zeal to protect sugar, drafted laws which expressly forbade the use of saccharin in certain applications. They did not foresee, however, the possibility that other synthetic sweeteners would be developed. Thus the laws, specifically mentioning saccharin, do not apply to other products.

The after-taste question has long been a controversial one. CW, however, did say this about Sucaryl and saccharin; "Each alone has an after-taste, but the combination doesn't." —ED.

Tree Eradicator

TO THE EDITOR: I just noticed the item entitled "Poisoning Oaks" (*July 16, p. 60*) which demonstrates the method of killing trees at the University of California . . . It suggests that this method (girding the tree and applying 2,4-D) is new . . .

We have a process of killing trees . . . we kill everything desired from the size of a broom handle upward . . . for about $6 per acre. The axe and squirt-can used by the University of California are as far behind as an oxcart is behind a new Chrysler or Cadillac . . .

One man, using the injector we developed, can do as much as five men can do with an axe and squirt-gun. It also uses only about one-fifth as much chemical and fluid as the other method . . .

REUEL W. LITTLE
Reuel Little Tree Injection Co.
Medill, Okla.

Horses, Hyphens

TO THE EDITOR: . . . Those letters (*Aug. 13, p.* 4) from Dr. Gauditz and Mr. Scott raised interesting questions . . . Anent Doctor Gauditz, desideratum—a substance guaranteed to thwart the gustatorial proclivities of equine friends—Some of us wonder if she has tried cellulose—in the form of wood—in the shape of fencelets. Besides adding a touch of rustic charm to the cottage, these hippodamous barriers should protect the landscaping

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

Profitable ideas in materials handling...

a "hands off" policy for bulk materials

How much do you pay for handling bulk materials? Chances are that you pay much more than necessary if you still use expensive manual methods.

In the light of current cost trends—labor rates up 79%, power costs up only 7% in the last 10 years—handling bulk materials by hand does not make good sense. And manual handling always means extra expense in the form of injuries, mistakes, wasted time and inefficiency.

Many plants have solved this problem by adopting a "hands off" policy for bulk materials . . . and have put it into effect with automatic Dracco "Airstream" Conveyors. The modern Dracco method for transporting any dry bulk material with air eliminates manual handling—one pair of hands at a control panel can move tons of materials at high speed through an enclosed dust-free system. Blending, weighing and batching can be done en route. And buying materials in bulk means added savings.

The savings of a "hands off" policy have been proved many times. For example, at a medium-sized Wisconsin plant the Dracco "Airstream" system has cut unloading costs 50%, reduced materials costs $3.50 per ton.

If you think a "hands off" policy makes sense for your plant, we will send a Dracco engineer to discuss the advantages of conveying by air. Or, if you prefer, we will send an informative 24-page brochure on this subject.

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equally well against hippocerfs, deer, other marauding munchers . . .

Re the orthology letter . . . I am surprised that Reader Scott did not leaf through a few more pages in Fowler and point out a long-standing punctual defection in contemporary journalese. I, for one, would like to know more about the Monsanto Lion, which—according to Fowler's hyphenology—you had decribed as participating in an Oil merger . . .

D. G. WEAVER
Port Huron, Mich.

Horses, the repelling thereof, and hyphenation are both mighty complex subjects—ED.

50% of What?

TO THE EDITOR: In your picture-text news article on Kenya (*Aug. 27, p. 18*) you said that the heat from the sun is so intense that the evaporation rate of water in a 4-ft.-diameter evaporation pan can average 50% a day . . .

How much evaporation is 50% per day? In your defense I will admit the possibility that such an evaporation pan has a standard depth . . . but that is not evident from what you said . . . Please educate your readers . . .

HALLOCK C. CAMPBELL
Associate Director of Research
Arcos Corp.
Philadelphia, Pa.

Keen observation. We fumbled, should have also set forth the standard depth (4 inches) of the pan.—ED.

Unfair, Unfitting

TO THE EDITOR: . . . It is not often that I am worked up enough to write a letter to any eggheaded editor . . . but I am now . . . for I just noticed that in discussing what scientists seek —in terms of monetary compensation and job security (*Sept. 3 p. 38*), you entitled the discussion "What Eggheads Want" . . .

I had always felt that your magazine was a high-caliber, couth and gentlemanly publication and I am amazed to see you indulging in such slang as "egghead" . . . You should not, in my opinion, refer to scientists—who offer much to society—in such a derogatory fashion; the word egghead carries, as far as I am am concerned, a connotation of contempt . . . it is ill-suited as an appellation for scientists and also in poor taste in a magazine as respectable and widely quoted

as yours . . .

As you may recall, the egghead became a center of political controversy during the past Presidential election. It seemed at that time that anyone who was an intellectual in any degree—even if he indulged in few and calm thoughts—even if he just thought—was an egghead. Thinking was not encouraged by some politicians . . . and they it was who were inclined to cast the sneer upon the intelligentsia . . .

So I recommend that you not use the word again . . . It is not fair nor fitting, nor, I am sure, in your view is it accurate or aptly descriptive of technologists . . .

ROLF S. JULIENO
Troy, N. Y.

We'll agree. No disrespect was intended, but the point is well taken.
ED.

Straight Figures

TO THE EDITOR: . . . It seems to me that many magazines report figures which purport to show that there is a grave shortage of technical men . . . and, not infrequently, the number of science graduates this year is shown to be shockingly less than in 1950. Many of these figures are factual in themselves but they require interpretation . . . For instance, 1950 was a peak year of GI graduations—not a normal nor average year. To compare other years with 1950 can be misleading . . .

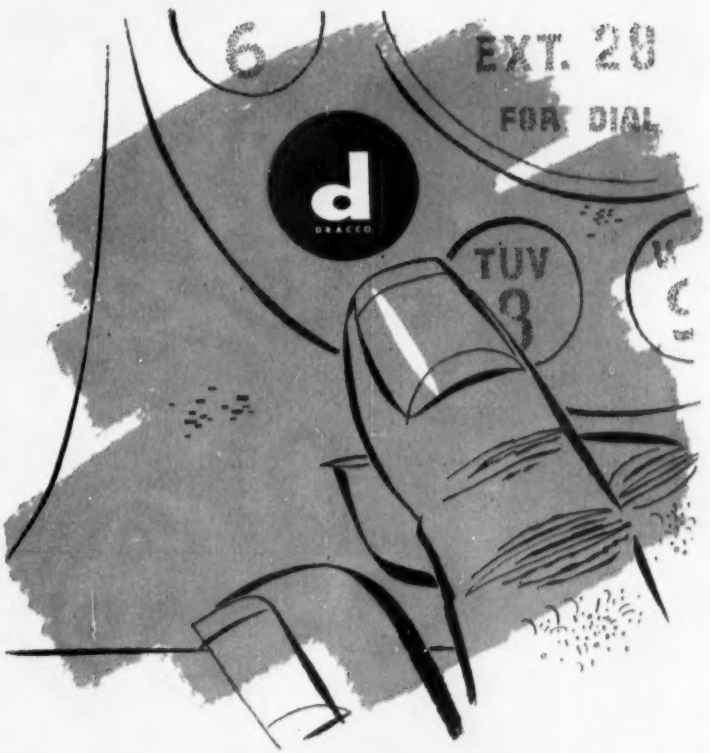
The magazine *Science* recently pointed out that the most carefully prepared figures justify our having serious concern for the future in terms of number of scientists. But the issue is only confused, and "the case for better science education is weakened if anyone uses figures which are abnormal, unrepresentative or subject to alternative explanation . . ."

That is a view which should be endorsed, in my opinion, by all who are concerned—and properly so—about the situation we face; we will need many, many chemists and engineers—many technoiogists of all kinds.

The facts are strong enough in themselves; if any group were to use figures that were misleading, it renders a disservice to all of us . . .

RAYMOND L. GERMAIN
Acme Co.
Tulsa, Okla.

Profitable ideas in Dust Control...



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in bulk materials handling and dust control

DRACCO

dracco *converts problems to profits*

How Circleville came to be the "Mylar" City*

"Mylar" is Du Pont's thin, transparent polyester film—very strong and with high dielectric strength. Chemically it is related to "Dacron" polyester fiber and in the short time it has been on the market has uncovered a wide range of industrial and decorative uses.

While "Mylar" polyester film was being readied for full-scale production, Du Pont was looking around for the ideal place to manufacture it. Du Pont is an old hand at picking plant sites. Final decision is made by a team of specialists—each an expert in one phase, such as living conditions, water supply, taxation, transportation costs. Over 100 possible sites were considered before Circleville, Ohio was chosen as the location that most nearly met all the specifications.

In its search, Du Pont had the full cooperation of the Chesapeake and Ohio Industrial Development Department. If you are seeking a location for a plant, a C & O Pin-Point Survey will give detailed information on all the factors that would influence your own choice of a site.

Send your inquiry in complete confidence to Chesapeake and Ohio Railway, Industrial Development Department, Cleveland 1, Ohio.

**"Mylar" is Du Pont's trade mark for its polyester film.*

Chesapeake and Ohio Railway

SERVING: VIRGINIA • WEST VIRGINIA • KENTUCKY
OHIO • INDIANA • MICHIGAN • SOUTHERN ONTARIO

NEWSLETTER

Now that the fourth quarter is only a fortnight away, even the most timid economic forecasters agree that the chemical industry is sure to smash most records in 1955.

Outlook now: that there will be more employment, greater profits, a higher level of business in the fourth quarter than in any other quarter in history.

•

With the boom showing no sign of slackening, any quick action on the part of Office of Defense Mobilization officials in expanding chemical tax amortization goals appears most unlikely.

Secretary of the Treasury Humphrey is especially opposed to expanding them. He not only feels that quick tax write-offs are an artificial business stimulus (and one not needed now), but also views the whole tax amortization program as a hindrance to the Republican aim of budget-balancing.

•

Only possible exception: expansion of aluminum capacity—about to be ordered by ODM.

Currently holding up release of this decision is the question of how to package a "subsidy deal." But that (as well as the problem of how much government money should be committed) might be cleared up within the week.

•

A slowdown in federal stockpiling is revealed in the Treasury Dept.'s latest report on spending in 1956. Materials involved include chemicals like iodine and castor oil, metals and minerals like lead, zinc, manganese and tungsten.

•

Reflecting the feeling of confidence that is enveloping the industry are Dept. of Commerce late estimates of capital expenditures.

For the current July-September quarter, chemical and allied products executives predict that spending for new plants and equipment will reach $284 million—a 12.7% increase over 1954's $252 million.

And for the last quarter of 1955, total spending should reach $287 million—a 3.6% jump over the $277 million spent in the October-December quarter of 1954.

•

Individual companies with big, new expansion plans:

• Southern Nitrogen Co., Inc., will build a $14-million petrochemical plant at Savannah, Ga. Production will include 250 tons/day of ammonia, nitric acid, urea, nitrogen solutions and fertilizer-grade ammonium nitrate. Natural gas (the principal raw material) will be supplied by Southern Natural Gas Co. of Birmingham, Ala.; completion is expected by late '56.

• The Nichols Chemical Co., Ltd., will start work immediately on a liquid aluminum sulfate plant in Canada's Niagara Peninsula.

Output is slated to go to the paper mills near Thorold, Ont.; due-in date: early '56.

The path of international business, like politics, doesn't always run smooth:

American Cyanamid charged Meiji Seiki (a Japanese pharmaceutical company) with infringement of Cyanamid's patent covering chlortetracycline production.

In a decision that came down last week, Cyanamid won its case—but it's now evident that similar instances are sure to crop up as global industrialization progresses.

•

Work stoppages because of disputes between unions are another source of annoyance, despite the nearness of the forthcoming AFL-CIO merger (*see p. 18*); but it appears that this kind of trouble won't be serious enough to endanger the business boom.

Latest case in point: the fracas between the AFL Painters and the CIO Rubber Workers at Niagara Falls, N. Y. Stauffer Chemical had let a contract to Metal Cladding Co. for cleaning and recoating some tanks for storage of chemical products; and the AFL Painters threw up a picket line because Metal Cladding's employees are members of the Rubber Workers. A temporary injunction has halted the picketing pending a full hearing, and the work is continuing on schedule.

•

The trial of four salt-producing firms charged with conspiracy to violate the Sherman Antitrust Act (*CW, March 26, April 16*) opens this week in the Federal District Court at Salt Lake City.

Presentation of evidence by the Dept. of Justice and cross-examination by defendant lawyers is expected to take about six days—and not even those closest to the situation are willing to venture a guess as to how the pendulum will swing.

Chemical process firms will be watching developments closely. Why? Many other U. S. operations enjoy what amounts to a similar area monopoly on salt resources.

•

Explosives producers—who have long complained they're beset by government red tape—will undoubtedly profit from the latest U. S. specifications governing traffic in arms and munitions (State Dept. Reg. 108,165).

Henceforth, release certificates (formerly required by the State Dept. for deposit with customs officials) are no longer needed for U. S.-to-Canada war chemicals shipments. Further: reports to the State Dept. (on terms of sale of military fuel thickeners, propellants and explosives) will no longer be necessary.

•

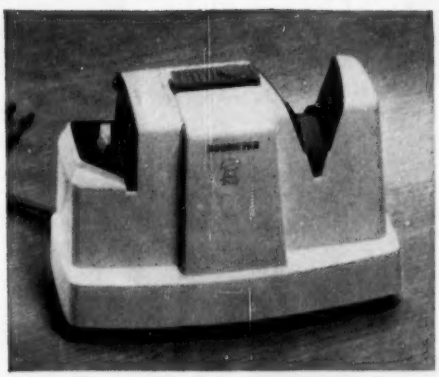
Call for help: One of the world's largest ethyl alcohol plants (in San Nicholas, Argentina) is currently idle for lack of about $2 million worth of effluent disposal equipment. Hanging in the balance: production of some 92 million liters/year of alcohol.

But company that makes a successful bid to put its know-how to work on the problem will be faced with a number of troubles. Included: simply draining off the effluent into the Parana River is not feasible: residues, almost 100% protein, must be recovered to support economic maintenance of the plant; the foreign exchange problem (especially rough in Argentina) must be solved.

hercocel®

FOR PRODUCTS ON THE MOVE

EASY TO USE—All it takes to operate the new Dormeyer "Edge-Well" Sharpener is finger-tip pressure on the center bar. For added safety, sharpener stops rotating as soon as pressure is released.



MADE TO LAST—A product of the Dormeyer Corp., Kingsbury and Huron Sts., Chicago 10, Ill., the "Edge-Well" is guaranteed by the manufacturer for one year against defects in material or workmanship. Hercocel housing by Plastic Precision Parts Co., 2535 West Madison St., Chicago, Ill.

As good looking as it is functional, the new Dormeyer "Edge-Well" Knife and Scissor Sharpener is a valued addition to anyone's kitchen. One sharpening wheel quickly gives a perfect edge to knives of any size or type; the other wheel restores scissors to "like new" cutting condition.

Like so many products today, the "Edge-Well" is molded with Hercocel A—Hercules® cellulose acetate. Long-wearing and durable, Hercocel is the perfect plastic for products that must stand up under hard usage. And Hercocel lends itself to modern styling, provides a finish that means extra sales appeal. In design, production and sales, versatile Hercocel keeps products on the move.

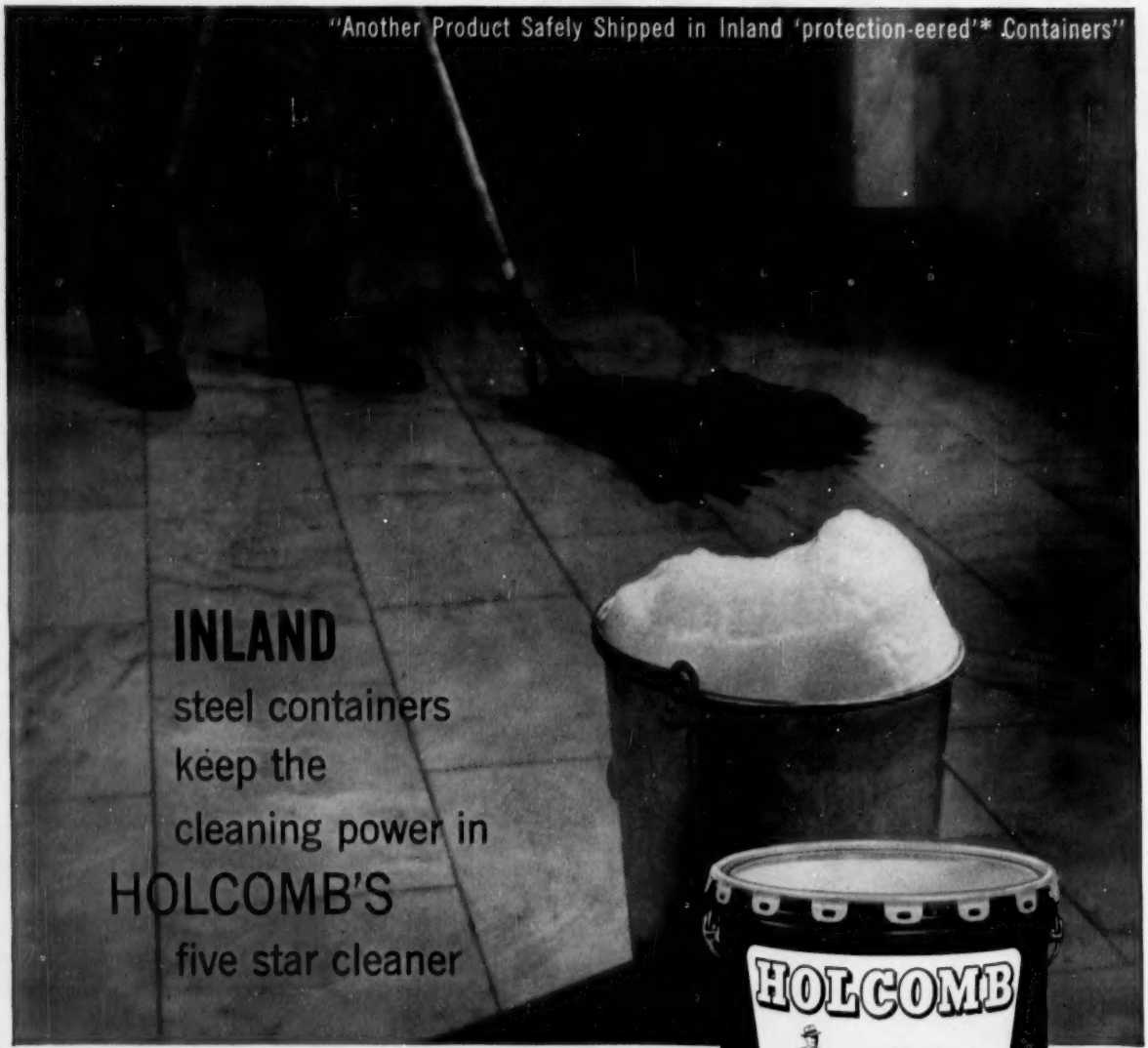
Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

992 Market St., Wilmington 99, Del.

CP55-5



The secret of FIVE STAR CLEANER, the all-purpose liquid synthetic cleaner made by J. I. Holcomb Mfg. Company, Inc., Indianapolis, producers of a full line of scientific cleaning materials, is its powerful detergent with sustained sudsing action.

When Holcomb first developed FIVE STAR CLEANER, they wanted to find a container that would retain all of the product's outstanding characteristics during shipment and storage.

Holcomb threw the problem to Inland Steel Container's packaging chemists. After a period of intensive research and field testing, a special liner was developed which would deliver FIVE STAR CLEANER to Holcomb's customers just as it was produced at the factory—sparkling clear, ready to do a fast and thorough cleaning job.

Today FIVE STAR CLEANER is shipped to commercial and industrial users throughout the country, exclusively in Inland "protection-eered" containers.

Have you a packaging problem Inland can help you solve?

INLAND

the right container with the right lining for your product

Write Mr. Robert Boecher, Room 234-A

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company

6532 South Menard Avenue • Chicago 38, Illinois

Plants: Chicago • Jersey City • New Orleans

BUSINESS & INDUSTRY. . . .

Tariff Cuts Coming...Where?

One or more of your company's bread-and-butter products may be among the chemical items on a long, still secret list of articles that—as of this week—are ticketed for a 15% tariff cut over the next three years.

This list—now being checked and rechecked in Washington—is expected to be released before the end of this month. It's been drafted by the State Department, with the help of the Commerce Department's Business & Defense Services Administration, as a first step in carrying out the three-year extension of the reciprocal trade act, as passed by Congress several months ago.

At the moment, no one—outside of the officials in those two agencies—knows exactly which chemicals are on the list. For companies producing those products in the U. S., reduced tariff rates on similar goods made abroad could mean greatly magnified competition in the years ahead.

Vulnerability Considered: In helping to compile the chemical part of the list, BDSA's Chemical & Rubber Section sought to look out for this industry's interests; but at the same time, it had to propose a number of items that the U. S. government might be able to use for trade concession bargaining at forthcoming negotiations with other members of the General Agreement on Tariffs and Trade (GATT).

Despite BDSA's pleadings for some segments of the industry deemed more vulnerable to foreign competition, certain chemical products in those categories have been put on the list, Chemical & Rubber section chief Theodore Hodgins told *CW*. Nevertheless, he says, over-all BDSA efforts to present the U. S. chemical industry's case have been "encouraging."

"We've tried," Hodgins says, "to be selective."

If your company is affected, your next move is to get set to argue it out at hearings to be held in Washington by the U. S. Tariff Commission's Committee for Reciprocity Information. Commission Chairman Edgar Brossard says those hearings are slated for next month. Their purpose: to pick up information to be used by the Tariff Commission in deciding which items will stay on the list, which will be dropped.

WIDE WORLD

BROSSARD: On chemical tariff rate cuts, he'll hold hearings.

Sure to be stressed by chemical companies testifying in these peril-point hearings: national defense factors, existing hardships already imposed by foreign chemical imports.

Sulfur Trend: Seaward

What may be a major source of sulfur for future decades is being opened for development off the Texas Gulf Coast this week; and two big producing companies are putting up a total of more than $8 million to lease the first nine underwater tracts to be auctioned by the Texas School Land Board at Austin.

Texas Gulf Sulphur Co. was high bidder on the first six tracts, offering $7.1 million as a bonus bid for rights on a total of 3,840 acres located from 1½ to 3 miles off Galveston Island. Freeport Sulphur bid $1,175,202 for three tracts totaling 4,320 acres farther out from Galveston (not adjoining the first six tracts).

These bids—averaging $1,850/acre on the first six tracts and $272/acre on the other three—have been formally accepted by the School Land Board, which stands to realize substantial income from the leases. The board is to get 12½% royalty on all sulfur produced from these lands plus annual rental of $3/acre after the first year. The royalty rate is twice as high as that paid for sulfur production on federally owned lands.

Other Bids Low: This was the state's first sale of offshore sulfur leases, and it followed the 1953 action of Congress to recognize state ownership of tidelands and other submerged lands within state boundaries.

Other bidders—Shell Oil, R. H. Abercrombie, John Rauhut and Frank Crerie—fell far short of matching Texas Gulf's and Freeport's figures.

Previously, the board had awarded to The Texas Co. oil and gas rights on certain offshore lands.

It's believed that a large sulfur dome lies under the ocean floor off the Galveston shoreline; but so far as is known, there's been no drilling for sulfur on these lands. Up to now, more than 95% of all U.S. sulfur has come from onshore Frasch units in Texas and Louisiana near the coast line.

Sulfur has been found by Humble Oil & Refining Co. in salt domes off the Louisiana coast. But to date, no sulfur has been produced from undersea deposits; in fact, it's doubtful that a workable process is known.

Texas still has other and even larger offshore acreages that may hold profitable sulfur deposits. Some of these may be placed on the block in another mineral lease auction tentatively scheduled for December.

The Kilgore Senate Antimonoply subcommittee is holding hearings this week to investigate the impact of antitrust laws on foreign trade and investments. Key subjects to be explored:

- How antitrust laws are affecting U. S. companies licensing arrangements abroad and minority stock ownership in foreign companies.
- The extent to which antitrust laws prevent U. S. concerns from granting exclusive sales territories to foreign companies which are not branches or wholly owned subsidiaries of U. S. firms.
- The desirability of granting limited exemption from antitrust laws to foreign investors.
- The extent to which antitrust laws have impeded the U.S. government guarantee program for foreign investments.
- The pros and cons of the proposed international agreement to curb restrictive business practices.
- The effectiveness of the Webb-Pomerene Act in helping American firms compete against foreign cartels.
- The extent to which manufacturing or distribution activities carried on abroad jointly by U. S. firms or by U. S. firms in cooperation with foreign competitors should be permitted.
- Whether or not the application of antitrust laws to the operations of a U. S. parent company and its subsidiaries is realistic.

Off With a Roar

The Senate Antimonopoly subcommittee headed by Sen. Harley Kilgore (D-W. Va.) started investigating the effects of U.S. antitrust legislation on foreign trade and investment this week. According to present plans, public hearings will be followed by on-the-spot studies in Europe of the problems created by U.S. antitrust laws for U.S. businessmen operating abroad.

The outcome (in the form of legislative recommendations) is bound to be of at least indirect interest to the chemical process industries—segments of which in the past have been either victims of foreign cartels or defendants in antitrust cases.

First Discord: Subcommittee hearings are focusing first on the question of the extent to which the antitrust laws hamper foreign investment. Witnesses from the Dept. of Commerce, the International Co-operation Administration, and private business groups have claimed that the fear of being prosecuted under the Sherman Act is deterring a substantial number of potential investors from venturing abroad.

Commerce Dept.'s testimony is based on a recent study of impediments to U.S. foreign investment—a study it claims shows that roughly 11% of the investing community considers antitrust laws a deterrent to foreign investment.

Spokesmen for the International Co-operation Administration, on the other hand, brought forth their experience under the agency's Foreign Investment Guarantee program—showing that it is extremely difficult for U.S. firms to find a profitable basis for sharing know-how abroad without violating the Sherman Act.

Several witnesses put the problem this way: Sharing U.S. technological know-how with friendly nations has been one of the key postwar objectives of U.S. foreign policy. Yet, the Sherman Act makes this virtually impossible. A U.S. firm licensing a process abroad cannot lawfully keep the foreign licensee from competing in the U.S. market or in third markets with the parent company. Exclusive sales territories cannot be allocated to two or more foreign licensees. And the U.S. company cannot agree not to export to the foreign-licensee's country.

Too soon: It's too early to predict what legal modifications the subcommittee will recommend as a result of its hearings. But Joseph Burns, an antitrust lawyer who is counsel for the committee, says that the following reforms are being considered:

- That the Dept. of Justice be required to rule in advance upon the legality of proposed foreign investments, thus removing the uncertainty allegedly deterring foreign investors.
- That permissible penalties for borderline cases be scaled down. As it stands now, Sherman Act violators are liable to criminal prosecution and to treble damage suits.

Antitrust experts supporting retention of U.S. laws in their present form argue that any weakening of the Sherman Act will stifle world competition, reduce sound investment opportunities, increase the cost of foreign raw materials, expose U.S. business to unfair competition from foreign cartels, hurt U.S. exports and weaken the economies of U.S. allies.

But so far, their words of protest are being smothered by the cries of those who feel that something must be done to clarify a muddy situation.

WIDE WORLD

KILGORE: Hearing both sides of a politically hot issue.

Last Minute Victory?

The United States and Cuba are negotiating this week on tariff agreements that may affect $750,000 worth of American export business.

Involved: calcium hypochlorite, calcium chloride, sodium silicate, sodium sulfate, aluminum sulfate and other alums.

Cuba is requesting tariff increases to allow protection of its domestic industry. (The present duty on the hypochlorite is $9.53/short ton, while a 2.27/ton levy is now exacted on the other commodities.)

But opposition to the Cuban request is growing—particularly among chemical companies concerned over the proposal to raise the hypochlorite duty*.

Specific Charges: U.S. producers of high-purity hypochlorite are particularly incensed. Sharing a $500,000 yearly market, they contend that the Cuban who is interested in producing such materials actually plans to make solutions and lower-active-ingredient powders—not competitive with high-purity hypochlorite imported from the U.S.

In addition, they contend that manufacture of top-grade material is not an easy process to master—that the Cubans won't soon be able to do it well.

Consumer Reaction Slow: Cuban consumer reaction to the duty-raising proposal has so far been of little help to the protesting U.S. firms.

Previous to the start of negotiations, the Cuban National Economic Council (a quasi- governmental group) held hearings on the entire range of commodities up for discussion.

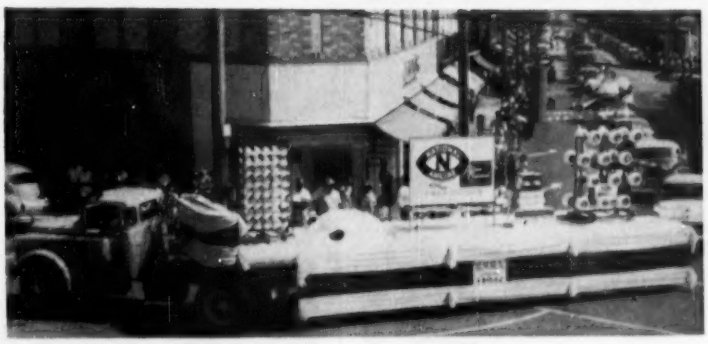
But while prospective Cuban producers (demanding higher tariffs) were very much in evidence, no hypochlorite consumers (chiefly Cuban sugar producers) were seen to protest.

Reportedly, the first that they heard of impending negotiations was when the U.S. suppliers advised them that increased costs were imminent—if Cuba went ahead with its plans.

Some Washington observers are predicting that now (with the influential sugar planters aroused) the government may withdraw its request for a tariff increase.

* Included: Olin Mathieson, Columbia-Southern, Pennsalt.

WIDE WORLD PHOTOS



Old-style Parade With New Cast

ONE PLACE WHERE Labor Day is still celebrated with a parade of floats-with-flourishes is Hopewell, Va., where new chemical process plants have been a principal factor in the city's rapid population increase (more than 100% in past five years). Floats—featuring modern chemical products made there—were co-sponsored by the companies concerned and District 50, United Mine Workers.

COMPANIES. . . .

Stockholders of Kaiser Aluminum & Chemical Corp. have approved an increase in the company's $50-par preferred stock from 700,000 shares to 1.5 million shares. No Kaiser preferred stock is now outstanding, the previous issue having been retired last August 12.

•

Foremost Dairies, Inc., is offering 202,925 shares of its $2-par common stock in exchange for 43,807 shares of second preferred stock, and 3,349 shares of common stock of Philadelphia Dairy Products, Inc.

•

Canadian mining executives are negotiating this week with the Irish government for mining rights at Avoca, County Wicklow, Ireland.

Involved are rights to an estimated 36 million tons of copper-bearing ore.

•

Velsicol Corp. (formerly a division of Arvey Corp., Cleveland) has changed its corporate name to Velsicol Chemical Corp.

•

Northwest Nitro-Chemicals, Ltd., has received further financial backing for its proposed multimillion-dollar chemical plant to be built at Medicine Hat, Alta. The extra aid: a royal Bank of Canada offer to provide a first mortgage of $12 million in serial bonds.

Estimates place the entire cost of Northwest Nitro's project at substantially more than $23 million—about $8.5 million of which is to be raised by issuance of 10-year, 5½% subordinate debentures.

Commercial production (of nitrogen and phosphate fertilizers) is now scheduled for Jan. 1, '57; output will be marketed both in the prairie provinces and in the northwest U. S.

•

Roger Williams Technical & Economic Services, Inc., will build new executive offices in the Princeton, N. J., area.

EXPANSION . . . .

Pharmaceuticals: Schering Corp. has started construction of a $1-million sterile-products building—first new unit in its planned expansion at Union, N. J. The structure is scheduled for completion by early spring, 1956.

Main feature of the new building: a large operational area so designed as to insure the sterility of the contents of vials and ampules—from the raw material stage to final packaging.

•

Phthalic Anhydride: Pittsburgh Coke & Chemical Co. will start construction work this fall on a $3-million plant to produce phthalic anhydride.

The plant will be located on Neville Island in the Ohio River below Pittsburgh, is a further step in the company's over-all expansion plans—which since 1947 have cost an estimated $47 million.

•

Portland Cement: Construction work will start before the end of September on Texas Portland Cement Co.'s $2.7-million plant, just north of Orange, Tex.

•

Polyethylene: Du Pont Co. will expand its polyethylene-producing units at Orange, Tex. at a cost of $500,000. Particularly singled out for a face-lifting: one of three Alathon resin units, which, it's said, will give the company increased rated capacity without the need for building completely new facilities.

•

Sulfur: Union Oil Co. of California will start construction work immediately on a second sulfur recovery unit at its Santa Maria, Calif., refinery.

The new plant, an additional pollution control measure, will be a duplicate of Union Oil's present unit at Santa Maria which removes 40-50 tons/day of sulfur from refinery process gases.

•

Pilot Plant: Nopco Chemical Co. will build a new pilot plant at Harrison, N. J. Use: development work and product improvement.

It's hoped the plant will be ready for occupancy by early 1956.

With Credit—All Around

PAKISTAN's long-awaited DDT plant—construction of which was arranged in 1951 under the expanded program of assistance sponsored by the World Health Organization (WHO)—is now in operation.

Located at Nowshera, the plant is expected to meet Pakistan's total requirements of DDT today, thus obviating the need for imports.

Dedication ceremonies received full-dress treatment from the Pakistani government—here represented by Frontier Minister Khan (wearing the Jinnah cap), who paid special credit to the U.S. Children's Fund for aid in the project.

From Accelerators to Wetting Agents— Rohm & Haas Methylamines

Rohm & Haas methylamines are ideal low-cost sources of basic organic nitrogen. They can be used as intermediates for many products, including rubber accelerators, pesticides, surfactants, quaternary disinfectants, pharmaceuticals, photographic developers and dyestuffs.

All three amines, mono-, di-, and trimethylamine, are supplied in both aqueous and anhydrous form, in drums, cylinders, or tank-cars. Large volume production in two separate plants guarantees you continuing availability; Rohm & Haas' twenty years experience in producing and handling methylamines assures you products of high purity and uniform, dependable quality.

Detailed, authoritative literature covering the use of these products is offered to assist you in research, process development, and plant design.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

HENDERSON PHOTOS

ELECTIONEERING: At plant, AFL organizer hands out leaflets (like the one below); CIO official gives pep talk.

A BETTER UNON FOR POTASH WORKERS—

OPERATING ENGINEERS Stationary INDUSTRIAL DIVISION

Any Union to be successful must contain a strong majority of the eligible members. IMCC maintenance workers have refused to join I.A.M. and a majority of you have said you will never join Mine-Mill. None of you want the company dominated Independent Union or the weak Stone Workers never before heard of outide Vermont. Because of fighting determination of the Engineers to represent the workers, more than 95% of all production and maintenance workers at Duval belong to the Engineers. 45 out of 52 maintenance workers at Duval have joined Local 855 of the Operating Engineers since the election there last month. Mine-Mill only had 24 members in this group. No Union will be successful if they are not able to get more members than presently belong to I.A.M. at IMCC.

UNITY IN THE POTASH BASIN

The Engineer's petition which would have united the production and maintenance workers of IMCC was attacked by every other union on the ballot. In spite of the damage by I.A.M., Stone Workers, Mine-Mill, and the Independent, the Operating Engineers requested a review on July 12th on our petition for an election in the production unit. No other Union would join with the Engineers in order to get this election. Others may delay the Operating Engineers but we will not quit until you, the workers, are united. We pledge that this fight shall continue until it is won.

Local 405 of the Operating Engineers just won an arbitration case for C.E. Randolph of Seagraves, Texas who had been discharged because he was 65 years old. Randolph was reinstated with pay for all time lost. Mine-Mill refused to take up "Cowboy" Holder's case at IMCC a few months ago and it was just like the Randolph case. The Mine-Mill representatives, including Attorney Nathan Witt, said Holder had no case and it could not be won. However, the Engineers just won one like it.

CAN MINE-MILL FULFILL THEIR PROMISES?

Mine-Mill is fighting for dear life right now. They know the only possible chance they have to keep the production group of IMCC is to win the maintenance group. Unless they do, they know all of IMCC is lost as far as Mine-Mill is concerned. But, can Mine-Mill deliver the goods even if they should win? Under a law passed late in 1954, the U.S. Justice Department is now actively engaged in investigating Mine-Mill because of alleged communists in office of that Union. The Attorney General can wipe out the contracts of Mine-Mill overnight and bar Mine-Mill from use of the N.L.R.B. The Operating Engineers have letters signed by the Department of Justice proving this statement. Can Mine-Mill guarantee that they will keep their promises?

PROPAGANDA: As in political elections, parties try promises and persuasion.

Rash of Raids:

When a situation is bad, any change looming on the horizon can induce hope for improvement, and some chemical-process companies have good reason to hope that the anticipated AFL-CIO merger — whatever other effects it may have—will at least lead to more stability in employee representation.

Up to this week—less than three months before that proposed merger —there's no sign of a letup in the scramble among some labor unions to take members away from rival unions in certain fields. One sector of the chemical industries that has been plagued by this kind of strife: the cluster of potash mining and refining operations at Carlsbad, N. M.

After the first three of those plants were established, most of their hourly-paid employees were organized by the AFL. The men switched several years later to what they considered a more "live-wire" union—the International Union of Mine, Mill & Smelter Workers (at that time affiliated with CIO). As Mine-Mill came more and more into conflict with CIO leadership and U.S. national policy, maintenance workers split off into "craft" units. Then, in 1950, Mine-Mill was ousted from CIO as Communist-dominated. And ever since, the Carlsbad potash workers have been considered fair game for other unions' raiding parties.

VOTING AND COUNTING: In court-house basement, worker casts secret ballot; that evening, NLRB reckons the score.

Due to Dwindle?

Steady Business for NLRB: Over the past five years, the National Labor Relations Board has had an almost steady stream of elections and disputes to handle in the Carlsbad potash basin. To their credit, the companies have managed to keep production high and have been adding new capacity each year. But management would welcome an end to all the campaigning that causes intraplant friction.

Example of the constant battling among labor unions over the potash workers: the recent grabfest on the part of five unions for a 157-man bargaining unit that the IAM had wrested away from Mine-Mill in 1950.

First balloting was inconclusive, in that no union came out with a clear majority. In the runoff election two weeks later, the International Union of Operating Engineers—which has embarked on a drive to take over all the Carlsbad potash workers—edged out the machinists, and promptly announced that its next goal would be that same plant's production workers, who up to now have stuck with Mine-Mill through thick and tan.

Fortunately, few chemical plants have been kept on edge by endless raiding like this. The AFL-CIO merger in December may bring some relief, but District 50 of the United Mine Workers will still be free to raid and be raided.

United States of America
National Labor Relations Board
SAMPLE
OFFICIAL SECRET BALLOT

FOR EMPLOYEES OF
INTERNATIONAL MINERALS & CHEMICAL CORPORATION (POTASH DIVISION)
Carlsbad, New Mexico

This ballot is to determine the collective bargaining representative, if any, for the unit in which you are employed.
If you spoil this, return it to the Board Agent for a new one.

MARK AN "X" IN THE SQUARE OF YOUR CHOICE

CARLSBAD POTASH BASIN UNION, INDEPENDENT	C.I.O.	MINE-MILL LOCAL 415	INT'L UNION OF OPERATING ENGINEERS, LOCAL 655, AFL	NONE	I.A. of M. LODGE 1900, AFL
2	18	12	55	0	47

United States of America
National Labor Relations Board
SAMPLE
OFFICIAL SECRET BALLOT

FOR EMPLOYEES OF
INTERNATIONAL MINERALS & CHEMICAL CORPORATION (POTASH DIVISION)
Carlsbad, New Mexico

This ballot is to determine the collective bargaining representative for the unit in which you are employed.
If you spoil this, return it to the Board Agent for a new one.

MARK AN "X" IN THE SQUARE OF YOUR CHOICE

INT'L. UNION OF OPERATING ENGINEERS, LOCAL 655, AFL	I.A. of M. LODGE 1900, AFL
72	62

RESULTS: Triumph in this election is only prelude to raid on larger unit.

Research grade fatty alcohols now by the ton

—as use zooms

From Additives for nuclear pile coolants to Zero temperature lube-viscosity improvers, fatty alcohols are in the news. Here are some of the newer ways to use the "chemicals with possibilities":

● **Protective coating** manufacturers use fatty alcohols as additives (to plasticize, emulsify, disperse) as well as a starting point for chemical synthesis. CACHALOT brand straight-chain alcohols are available in large tonnage for prompt delivery, competitively priced.

● **Detergent oils** clean better when compounded with stearyl alcohol: a few percent acts as a synergist, also inhibits corrosion of bearings. Both USP & technical CACHALOT stearyl alcohols are clean, white, free-flowing flakes, packed in sealed polyethylene bags inside sturdy cartons, in handy fifty pound units.

● **PVC plasticizers** derived from fatty alcohols have greater low-temperature stability than dioctyl phthalate, without loss in film properties. Suggestion: try one of the ten varieties of CACHALOT unsaturated alcohols—or ask for custom blends to meet your needs.

● **Lagging oil wells** show increased output when chemically treated with fatty alcohol sulfates. The high uniformity of CACHALOT cetyl, stearyl, or oleyl alcohols makes them easy to sulfate—just one of many versatile reactions of these basic intermediates.

● **On the frontier** of today's chemical progress, research chem-men often specify CACHALOT fatty alcohols. Newest techniques of vacuum distillation and high-pressure hydrogenation produce this large line of saturated and unsaturated alcohols to tight specifications: saponification values under 1.0, acid values below 0.1—result of over a quarter century of original research in higher alcohols.

● **Survey the field:** to find out how you can profitably use CACHALOT fatty alcohols, write for a data file designed for your product or process.

CACHALOT *is a registered trade name of M. Michel and Company, Inc., thirty years a basic supplier of chemicals.*

MICHEL

M. Michel and Company, Inc.
90 Broad Street, New York 4

West Coast Enterprise

Two expansion developments in British Columbia last week point up once again the rapid growth of Western Canada's chemical process industries.

First chlorine-caustic soda plant on the Western Canadian seaboard is expected now to start turning out industrial chemicals for the oil refining, pulp, plywood, and adhesives industries early in 1957.

Hooker Chemicals of Vancouver is the owner of the plant; estimated cost: $11 million.

Dredging for a deep-sea dock starts this week; it's expected to take eighteen months before the batteries of electrolytic cells can start turning out chlorine and caustic—previously imported from the U.S.

In all, an estimated 1 million cu. yds. of sea bottom will be dredged to the surface to build up the foreshore necessary for the plant.

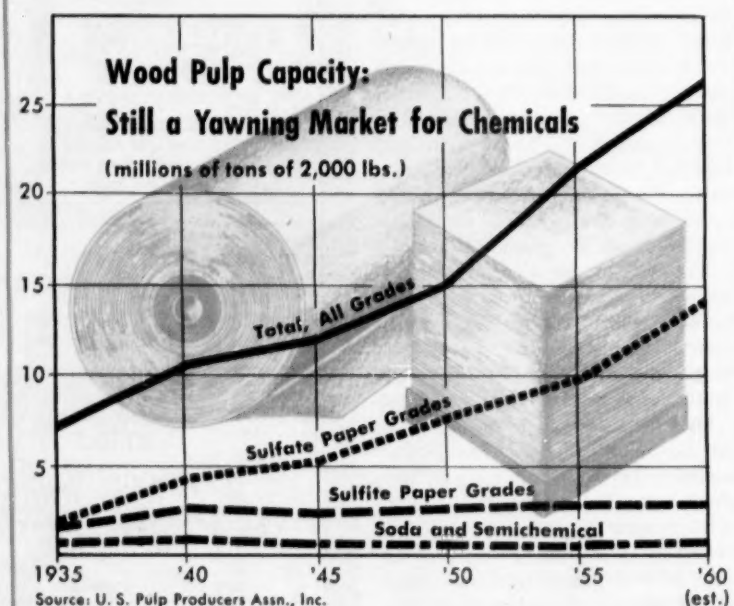
Company officials say construction of details have been under consideration since 1952.

Meanwhile, Canadian Forest Products (also of British Columbia) is spending more than $1.3 million to expand its Port Mellon pulp mill on Howe Sound. Major expenditure: $1.25 million for a boiler shop and black liquor recovery furnace.

Bethlehem Steel Co. has been retained to do steel construction work on the expansion project; the furnace will be installed by Combustion Engineering (Montreal).

In addition: Canadian Forest Products is undertaking a $25,000 road surfacing job, expects to have its entire operation in running order by mid-1956.

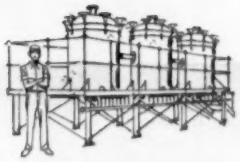
IMPACT



Converting Chemicals to Profits

REFLECTING INCREASED paper consumption/capita and newfound uses for chemical celluloses, U.S. wood pulp capacity is angling sharply upward. Closely paralleling its rise: consumption of chemicals used in conversion processes.

In 1954 alone, for example, pulp and paper industries consumed an estimated 700,000 tons of lime, 700,000 tons of sodium silicate, 670,000 tons of salt cake, 550,000 tons of sulfur, 400,000 tons of chlorine, 450,000 tons of alum, 750,000 tons of rosin, and 325-000 tons of soda ash.



only one man needed to operate ENZINGER dry cake discharge filters

The exclusive "Dry Cake" discharge design has all the advantages of the standard Enzinger leaf type pressure filters, plus a thoroughly proven method of semi-dry cake recovery. Enzinger filters are available in stainless steels, Carpenter 20, Monel, Nickel, and other special alloys.

Important design features include:

1. Minimum floor space required.
2. Filter cake has unobstructed discharge.
3. Shell and leaves remain stationary.
4. Filtrate piping remains intact.
5. One man operation.
6. Available with quick opening heads.

ENZINGER DRY CAKE DISCHARGE FILTER

Enzinger filter leaves reduce filtration costs. Made by craftsmen to exact requirements, Enzinger leaves are of guaranteed quality. There is no by-passing between the drainage channel and the screen. Perfectly riveted screens with extra strong frames provide long service life. Oversize nozzle and tubular drainage channel cut down pressure drop and provide high filtration rate.

Enzinger filter leaves are available in all metal construction of stainless steels and special alloys, and with filter cloth bags for special applications.

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Enzinger Division
Angola, N.Y.

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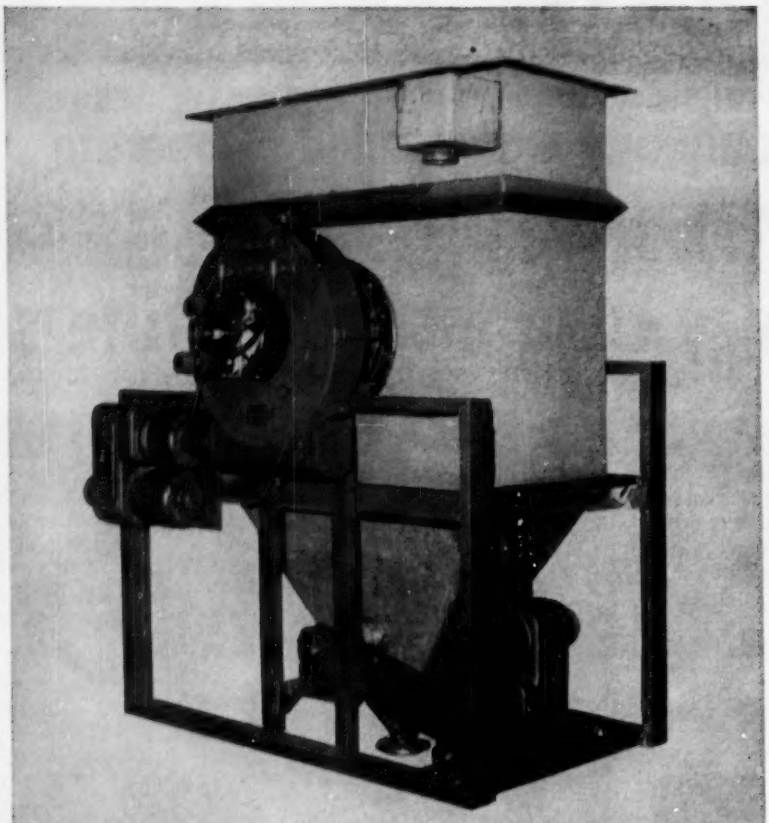

Another Eimco Continuous Vacuum Filter

The machine pictured is built as two different machines. One contains a drum type filter with a top feed for drying sand or other crystalline materials. The other contains a disc type thickener filter which runs completely submerged. It is built with a large port for carrying the clarified product or filtrate and a small port arranged to admit a small amount of blow at the bottom sector for dislodging the thickened material so that it can be discharged at the bottom of the tank.

These are special filter applications and examples of developments in liquid-solids separation through filtration.

Eimco, with more than half a century of experience in serving the process industries, makes drum, disc, pan, pressure, plate and frame and tubular type filters with numerous attachments that can be applied to processing industries with difficult filtration problems.

Write for complete information.

EIMCO

B-141

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B & I. . . . . .

WIDE WORLD

GOVERNOR FAUBUS: Under attack, last part of his 3-point tax plan.

LEGAL. . . . . .

Tax Plan Attacked: A suit pending this week before the Arkansas Supreme Court serves as notice that exemptions to that state's sales tax law are hard to come by. In campaigning for election last year, Gov. Orval Faubus had advocated that the 2% sales tax not be levied on sales of feed, seed, and fertilizer. This year, the legislature turned thumbs down on two of those items but exempted poultry and livestock feed. Now that act is being attacked by a group that's asking the state's high court to order the question put before the voters for referendum in next year's general election.

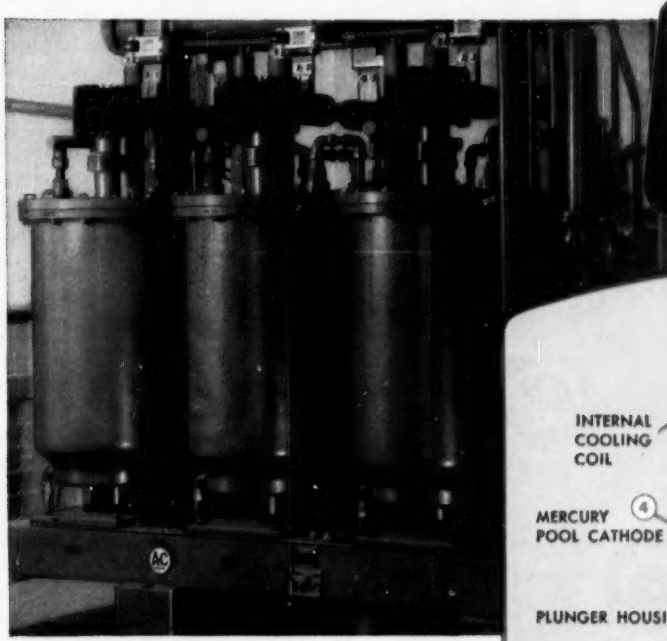
Another Arkansas lawsuit of chemical process interest: Aluminum Co. of America and other large industrial users of natural gas have lost one round in their fight against the Arkansas Louisiana Gas Co.'s move to increase its gas rates. State Circuit Judge Guy Amsler refused to act on the gas users' petition before the Arkansas Public Service Commission has issued its final order on the utility firm's rate application.

•

Corn Processors Sued: The U.S. is bringing suit against three chemical process firms that bought corn from an Illinois grain concern whose owners have been convicted for illegally selling corn that belonged to the government's Commodity Credit Corp. However, Assistant District Attorney

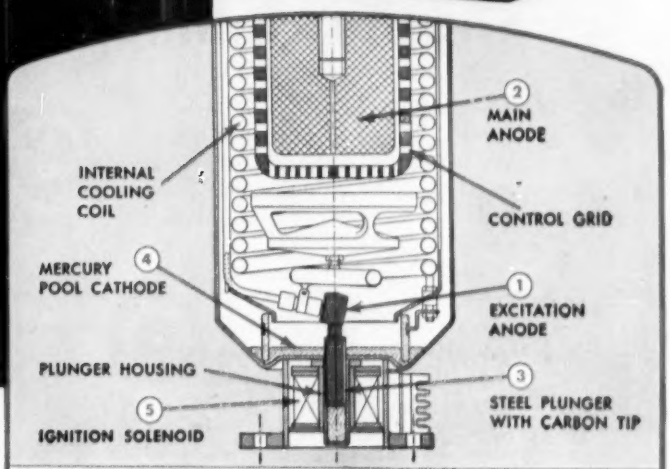
Here's the Rectifier That Needs

No Delicate Adjustments



This 1000-kw, 6-tube excitron rectifier is typical of units used for heavy-duty service in many industrial plants.

ALLIS-CHALMERS
Mercury Arc Rectifiers



Unique Plunger Starts Continuous Excitation

The excitron tube has an excitation anode ① in addition to the main anode ② . With the excitation circuit de-energized, the steel plunger ③ floating in the mercury pool cathode ④ makes positive contact with the excitation anode (as shown).

When the excitation circuit is energized, the ignition solenoid ⑤ pulls the steel plunger ③ away from the excitation anode ① and under the mercury pool cathode ④ , thus drawing a dc arc and forming the cathode spot, which makes conduction of load current by the tube possible.

If power is interrupted the plunger will float up, contact the excitation anode and automatically re-establish the excitation arc when power is restored.

LITTLE MAINTENANCE IS NEEDED with Allis-Chalmers excitron-type rectifiers. Excitation of the excitron rectifier is continuous, while other types of rectifiers require re-ignition 60 times a second.

Since it is more difficult to start a rectifier arc than to maintain it, the excitron rectifier is much less likely to lose excitation during operation. Momentary dips in supply voltage which are encountered in many supply systems have no effect on the continuous excitation arc.

Years of operation in hundreds of installations have proved the reliability and ease of operation of Allis-Chalmers mercury arc rectifiers. You can get complete information from your nearby A-C office. Or write Allis-Chalmers, Milwaukee 1, Wis.

A-4581

ALLIS-CHALMERS

the Purest EDTA

available commercially

Glyco's ethylenediamine tetraacetic acid (EDTA) and its salts – the TETRINE®S – are the purest forms available commercially, from a new plant specially designed to make these sequestering agents.

Effective against a wide range of di- and trivalent metal contaminants, Glyco's EDTA and salts are stable to storage and to all temperatures and pHs commonly encountered. They chelate efficiently in high concentrations and extreme dilutions of metal ions.

These are some of the industries using Glyco's EDTA:

Textile	Germicide
Soap	Latex
Detergent	Leather
Rubber	Metals
Cosmetic	Pulp & Paper

Our plant, products, personnel – all are geared to the elimination of your contaminant troubles. Send for samples and our catalog *The TETRINE®S.*

*Send for analysis report.

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Glyco's EDTA

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NONIONIC SURFACTANTS • SYNTHETIC WAXES • EMULSIFYING AGENTS

B & I. . . . . . .

Alexander Walter at Chicago explains that the process companies and other firms named in the new suit won't be penalized if they can show that they bought the corn in good faith, not knowing that it was U.S. property.

•

Drug Imitator Enjoined: A Los Angeles manufacturer and a Whittier, Calif., drug store have been enjoined by the U.S. district court at Los Angeles from making and distributing a product allegedly intended as a substitute for "Premarin," a conjugated estrogen preparation made by Ayerst Laboratories.

In Under the Wire

Final tax write-offs to be granted under the old fast amortization rules have been released by the Office of Defense Mobilization.

Two certificates to chemical companies were included in the list, though it's generally conceded that both would have been issued either under the old or the newer, more stringent, rules.

Write-offs granted:

• To National Distillers Products Corp., Cincinnati, Ohio, 50% of $471,000 for research and development facilities.

• To General Aniline and Film Corp., Rensselaer, N. Y., 65% of $286,900 for plastic products for military aircraft.

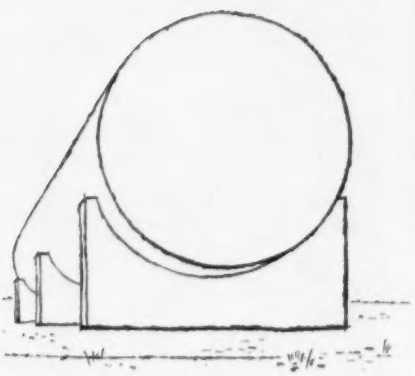
Under Scrutiny: Henceforth, however, grants to chemical companies may be infinitely harder to get.

The entire government rapid tax amortization program is getting a close review by top federal policy makers for an exclusive report now due later this month.

CW Report

Next Week . . .

CW Report authors John Calkin and Robert Frank take a searching look at the pulp and paper industry, see continuation of the over-all growth pattern.

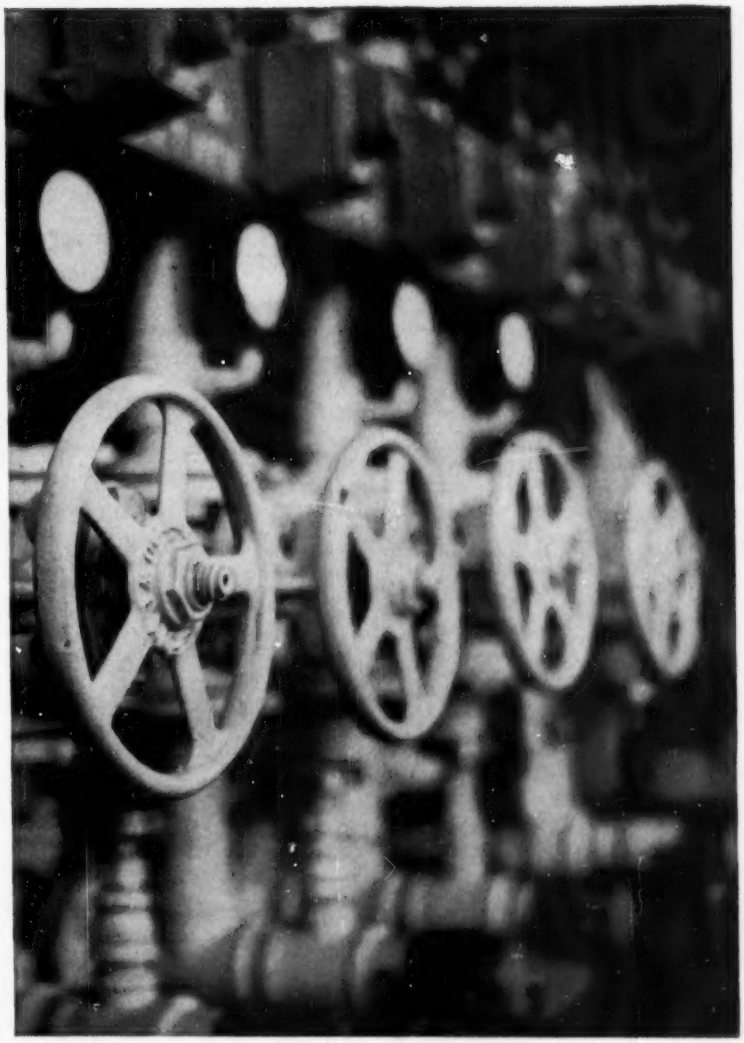


acetaldehyde—
pharmaceutical raw material
denaturant
chemical intermediate

crotonaldehyde—
denaturant
chemical intermediate
specialty solvent

n-butyraldehyde—
chemical intermediate
plastic intermediate
pharmaceutical intermediate

isobutyraldehyde—
pharmaceutical intermediate
resin raw material
chemical raw material



Eastman aldehydes

For samples and information about Eastman aldehydes and other Eastman industrial chemicals, call our nearest sales office or write to Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

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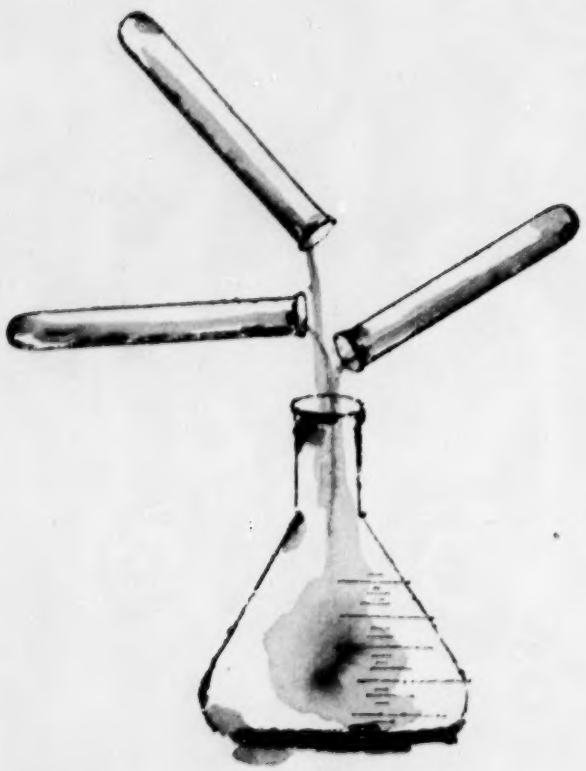

When Chemical Men need financial help . . .

It takes more than imaginative research and brilliant technology to keep progressing in chemicals. There is another element—sound financing.

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WIDE WORLD

A. D. LEWIS: From District 50, no plea for guaranteed annual wage.

LABOR. . . . . .

No 'Marxian Babble': So far, there's been no outcry by local unions of District 50, United Mine Workers, for the guaranteed annual wage; and the word is out this week on why such pleas are not likely to be heard in the future.

A. D. (Denny) Lewis, president of District 50, has been telling his membership what his older brother—UMW chieftain John L. Lewis—recently said on the subject. The new coal wage agreements, the older Lewis maintains, are good because the increase is all in straight wage rates. In a phrase that appears to demonstrate scorn for a modified GAW provided in the new auto and can company wage pacts, Lewis boasted that his new coal wage contracts are "devoid of Marxian babble."

•

Inflationary Trend: There was apprehension that a new inflationary wage trend might be starting this summer with the big pay rises provided in the "Big Steel" and other major industrial agreements; and now there's a wave of relatively high wage settlement in the chemical process industries. Contracts in the news this week:

• At Parkersburg, W. Va., an 11¢/hour basic wage rate increase for steam station workers at Union Carbide's Electro Metallurgical Co. division plant. The union: Oil, Chemical & Atomic Workers (CIO).

Reilly

First in Pyridine Chemistry ...manufacturing facilities second to none

Reilly manufacturing "know-how" has made possible the commercial availability of such new chemicals as Pyridine N-oxides, Methyl Isonicotinate, Acetylenic derivatives, Pyridine Alkanols, and Benzoylpyridines . . . Developed by Reilly Researchers, these products present new opportunities for improved chemical manufacturing.

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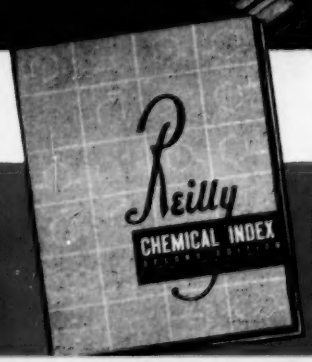
2-ETHYNYL BUTANOL-2
PIPERIDINE
2,6-LUTIDINE



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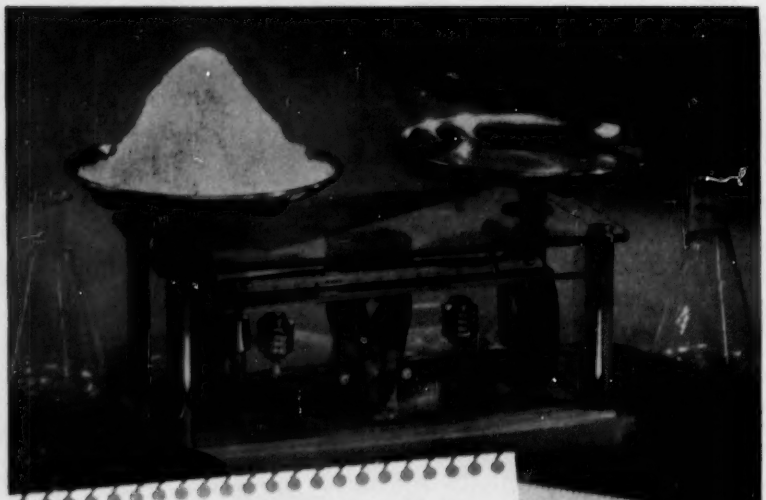


Data, condensed.
Subject: Fillers.

Books could be (and have been) written on "fillers." But here—compressed into 57 seconds worth of time—are the salient points of Dicalite filler materials, quick and easy to review for possible application in your own projects.

Dicalite fillers are processed from diatomite into uniform, finely divided amorphous powders, practically pure SiO_2.

MELTING POINT. 2900°F, approx.
MOISTURE. From 0.1 to 6%, depending on grade.
IGNITION LOSS. 0.1 to 5%, approx.
PARTICLE SIZE. Grades varying in fineness up to trace retained on 325 mesh screen. Coarser available.
POROSITY. 70 to 95%.
SURFACE AREA. 7,000 to 150,000 sq. ft./lb.
DENSITY. 7 to 13 lb./cu. ft., loose weight. Apparent specific gravity, 0.112 to 0.21; actual specific gravity, 2.00 to 2.35.
ABSORPTIVENESS. 120 to 300% of weight of Dicalite.
WETABILITY. Excellent.
INERTNESS. Essentially inert in aqueous and acid solutions.

Dicalite fillers supply bulk without significant weight increase and give added strength and toughness. They also improve flexibility, reduce brittleness, decrease heat conductivity, and improve abrasion resistance. In certain products, appropriate Dicalite materials provide excellent mild polishing qualities.

We will be glad to advise on the most suitable Dicalite grade for your purpose, or to work with you in developing a custom-made filler for your particular needs. Write us.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION
GREAT LAKES CARBON CORP.
612 SOUTH FLOWER ST.
LOS ANGELES 17, CALIF.

B & I. . . . . .

• At Holyoke, Mass., a 10¢ boost for employees of Shawinigan Resins Corp. The plant force is represented by the International Chemical Workers Union (AFL).

• At eight plants of Firestone Tire & Rubber Co. from Massachusetts to California, a 12¢ general wage increase and other benefits for about 22,500 wage earners represented by United Rubber Workers (CIO).

• At Niagara Falls, N. Y., increases of 5 to 6¢/hour for Olin Mathieson Chemical Co. employees with an additional 3¢ for certain maintenance men. This agreement ended a 3½-week strike that had been waged by OCAW Local 614.

•

Political Test: This fall will bring a test of labor unions' current pulling power in politics. In Ohio, the CIO is asking its members and friends to vote to increase unemployment compensation $33 to $50/week.

KEY CHANGES. . .

Bert Cremers, to vice-president and general manager, Michigan Alkali Division, **Frank B. Wolcott,** to vice-president and general manager, Research and Engineering Division, and **George W. Schwarz,** to vice-president and general manager, General Products Division, Wyandotte Chemicals Corp. (Wyandotte, Mich.).

R. W. Eddy and **J. J. Morris,** to assistant managers, Fine Chemicals Division, Carbide and Carbon Chemicals Corp. (New York).

Jack C. H. Stearns, to executive vice-president, Dow Chemical International Ltd. (Midland, Mich.).

Robert U. Haslanger, to director, industrial sales, Stauffer Chemical Co. (New York).

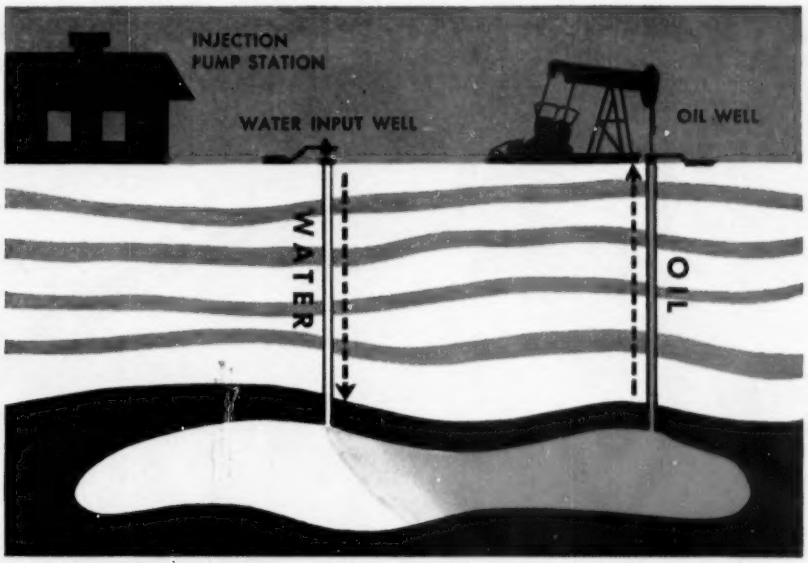
Charles E. Brookes, to sales manager, organic chemicals, Dewey and Almy Chemical Co. (Cambridge, Mass.).

John A. McNiff, to secretary, Mobay Chemical Co. (St. Louis, Mo.).

George B. Baylis, to assistant treasurer, and **J. H. Tyler McConnell,** to secretary, Hercules Powder Co. (Wilmington, Del.).

Russell T. Lund, to vice-president, National Carbide Co. (New York).

Julian M. Avery, to director, Product Development Division, Ethyl Corp. (New York).



"Secondary recovery" brings much additional oil from depleted fields, involves injecting Dowicide-treated water into oil-bearing formations to flood the oil to the surface.

Dowicide Preservatives

reduce possibility of costly, troublesome plugging of oil-bearing formations

Sulfate-reducing bacteria in oil fields contribute to corrosion of water- and oil-carrying pipe lines . . . Dow Preservatives control them.

Certain by-products are formed during the corrosion of metal pipe lines by sulfate-reducing bacteria. These by-products contribute to plugging of the oil-bearing formation's porosity. The plugging hinders pumping operations. When Dowicide® Preservatives are added to the flooding water or to the water-oil mixture carried by metal pipes, these troublesome bacteria are controlled.

Fourteen Dowicide Preservatives of widely varying characteristics, but all identified by high stability, ease of handling, and proved effectiveness, are available today to industry. Among the businesses that hold top product quality or improve manufacturing efficiency with versatile Dowicide Products are paint, leather, adhesives, textile, paper and pulp, agricultural, transportation, cordage and other concerns. *You* might well benefit your processing, packaging or selling operations by using one or several of these outstanding bactericides, germicides or fungicides.

Dow's laboratory specialists will consult with you regarding individual preservative problems. For detailed information, mail coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan.

Pipe cutaway (left) shows typical corrosion of metal pipe lines occurring in the presence of sulfate-reducing bacteria.

THE DOW CHEMICAL COMPANY DP-652A-1
Dept. DP 652A, Midland, Michigan
Please send me further information on the uses of Dowicide Preservatives.

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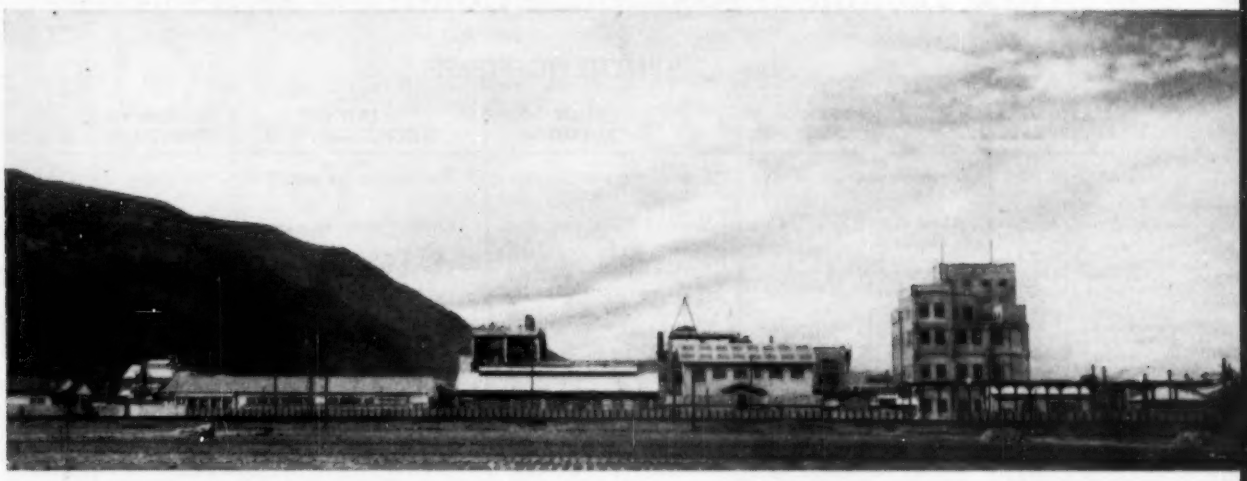

No chemical company thinking about doing business in Japan can afford to ignore the Japanese government's recent clampdown on new foreign investments. For the move signals a sharp shift in thinking. After years of occupation, the Japanese are wary of all forms of foreign partnership that could result in further alien domination of the home industry. They desire a return to the system of cartels and amalgamations that exerted so powerful an influence on government policies before the war, and are . . .

Pushing for Protection

U.S. chemical companies—both those considering investment and those considering reinvestment—face a dubious future in Japan today. Only once in the past eight months has the Japanese government approved a case of new capital investment involving a chemical firm; less than a handful of reinvestment projects have passed scrutiny, and only eight technical tie-ups have been sanctioned over the same period.

This record contrasts sharply with figures of previous years, when virtually any agreement that promised to build up Japanese industry was deemed acceptable. (From 1950-54, for example, more than a dozen cases of U.S. capital investment in chemical facilities were recorded, *see tables.*)

Behind the clampdown on future investment is undoubtedly a rapidly emerging spirit of nationalism. The Japanese, conscious of the degree to which foreigners have "invaded" their industry, are demanding government action—now. Moreover, they resent the degree to which competition (stimulated by postwar occupation policies) has taken root.

Geared to protection, the Japanese business mentality *wants* a system of cartels—almost without restrictions. Faced by chronic twin problems—overpopulation and unemployment, it *fears* modernization, which, temporarily at least, would throw thousands of employees out of work.

Only in specific fields, therefore, is there much chance that many more "foreign participation" pacts will be passed—and only then if the investment fits into the nation's economic reconstruction program.

Specifically, henceforth, all investments must help Japan improve its international payments position by contributing to the development of the native industry — thereby permitting increased exports or conservation of foreign exchange now expended on imports. Offers involving pure technical aid will be favored over straight investment; investment by individuals will be preferred over that of companies.*

Only exceptions to this strict policy shutoff: foreign investment in pharmaceuticals and petrochemicals—both industries that do not depend as do most others in Japan, on large-scale imports of raw materials.

Significantly, the only new capital investment project approved by the government this year involves a U.S. pharmaceutical maker. After two years of consideration, Merck & Co. was granted the right (last February) to join with Banyu Seiyuka Co. on a 50-50 basis to form a new company called Nippon Merck-Banyu Co., Ltd. Capitalized at $139,000 (one-half the authorized capital), the joint concern will start producing 12-13 kilograms/month of cortisone and hydrocortisone before the end of the year, using imported raw materials until Japan is

* Investment by individuals is still almost certain of approval because of the improbability of a Japanese company falling under control of such stockholders. But individuals, though profiting heavily from high dividend rates of most Japanese companies (from 6-12% for blue-chip stocks, 10-12% for basic chemicals, higher for drug companies), are still handicapped by regulations concerning remittance of proceeds from the sale of stocks.

How Technical Assistance Contracts Stand Today

SYNTHETIC FIBERS

DATE OF APPROVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
April 12, 51	Toyo Rayon Co., Tokyo	E. I. du Pont de Nemours & Co., U. S.	Nylon (manufacture)	15 years	A' B
March 17, 53	Asahi Kasei Kogyo Co., Osaka	Beaunit Mills, Inc., U. S.	Rayon yarn (manufacture)	10 years	A'
April 6, 54	Teikoku Jinzo Kenshi Co., Osaka	Farbenfabriken Bayer A. G., Germany, and Ing. A Maurer S.A., Switzerland	Acetates (manufacture, dyeing, and finishing)	5 years	A B
May 4, 54	Asahi Kasei Kogyo Co., Osaka	Seaman and Seaman, and Robert P. King, U. S.	Alkali cellulose (continuous aging)	15 years	A B
May 4, 54	Nitto Boseki Co., Tokyo	Seaman and Seaman, and Robert P. King, U. S.	Alkali cellulose (continuous aging)	15 years	A B
June 1, 54	Nippon Rayon Co., Uji City, Kyoto-fu	Inventa A.G., Switzerland	Nylon 6 (manufacture)	15 years	A' B
July 20, 54	Teikoku Jinzo Kenshi Co., Osaka	Seaman and Seaman, and Robert P. King, U. S.	Alkali cellulose (continuous aging)	15 years	A B

PHARMACEUTICALS AND AGRICULTURAL CHEMICALS

DATE OF APPROVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
Jan. 20, 51	Takeda Yakuhin Kogyo Co., Osaka	Ciba Ltd., Switzerland	Sulfa drugs (manufacture)	5 years	C
Jan. 30, 51	Nichizui Trading Co., Ltd., Tokyo	J. R. Geigy, S.A., Switzerland	Insecticides (DDT) (manufacture)	9 years	C
Feb. 12, 51	Nippon Soda Co., and 33 other companies, Tokyo	Nichizui Trading Co., Ltd., Japanese corporation of Swiss origin	Insecticides (DDT) (manufacture)	9 years	C
April 12, 51	Kyowa Hakko Kogyo Co., Tokyo	Merck & Co., Inc., U. S.	Streptomycin (manufacture)	15 years	C
April 12, 51	Meiji Seika Co., Tokyo	Merck & Co., Inc., U. S.	Streptomycin (manufacture)	15 years	C
April 12, 51	Ishihara Sangyo Co., Osaka	American Chemical Paint Co., U. S.	Herbicides (2, 4-D) (manufacture)	9 years 3 months	B
April 12, 51	Nissan Chemical Industry Co., Tokyo	American Chemical Paint Co., U. S.	Herbicides (2, 4-D) (manufacture)	9 years 3 months	B
June 20, 51	Yamanouchi Seiyaku Co., Tokyo	Spac Corp., U. S.	Sulfathiazole (manufacture)	15 years	C
June 20, 51	Shiono Yoshi Seiyaku Co., Osaka	Spac Corp., U. S.	Sulfathiazole (manufacture)	15 years	C
June 23, 51	Osaka Godo Co., Osaka	Nichizui Trading Co., Ltd., Japanese corporation of Swiss origin	Insecticides (DDT) (manufacture)	8 years 7 months	C
June 23, 51	Toyo Oil Co., Tokyo	Nichizui Trading Co., Ltd., Japanese corporation of Swiss origin	Insecticides (DDT) (manufacture)	10 years	C
July 18, 51	Sankyo Co., Tokyo	Parke, Davis & Co., U. S.	Chloromycetin (manufacture)	15 years 3 months	C
Sept. 5, 51	Hokkai Sankyo Co., Sapporo	Nichizui Trading Co., Ltd., Japanese corporation of Swiss origin	Insecticides (DDT) (manufacture)	8 years 5 months	C
Sept. 5, 51	Hokushu Kagaku Kogyo Co., Sapporo	Nichizui Trading Co., Ltd., Japanese corporation of Swiss origin	Insecticides (DDT) (manufacture)	8 years 5 months	C
Sept. 16, 52	Takeda Yakuhin Kogyo Co., Osaka	U. S. Vitamin Corp., U. S.	Mixed water-soluble vitamins	5 years	C

*Letters in remarks column indicate:

A—Direct contribution to improvement of international payments
B—Direct contribution to development of heavy industries
C—Direct contribution to development of public works

A'—Indirect contribution to improvement of international payments
B'—Indirect contribution to development of heavy industries
C'—Indirect contribution to development of public works

DATE OF APPROVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
March 31, 53	Ciba Seihin Co., Osaka	Ciba Ltd., Switzerland	Antihistamic (manufacture)	5 years	C
March 31, 53	Banyu Seiyaku Co., Tokyo	Wyeth International Ltd., U. S.	Penicillin (manufacture)	15 years	C
March 31, 53	Pfizer-Tanabe Co., Tokyo	Pfizer Corp., Panama	Terramycin, etc. (manufacture)	15 years	C
April 21, 53	Fujisawa Yakuhin Kogyo Co., Osaka	J. R. Geigy, S.A., Switzerland	"Irgapyrin" for neuralgia and rheumatism, and newest sulfa drug "Irgafen" (manufacture)	2 years 8 months	C
May 6, 53	Lederle (Japan), Ltd., Tokyo	American Cyanamid Co., U. S.	Aureomycin (manufacture)	15 years	C
May 28, 53	Lederle (Japan), Ltd., Tokyo	Falco Metal Products, Inc., U. S.	Loan of Accogel as well as technique of setting, operating, and maintaining it.	2 years	C
July 21, 53	Sumitomo Kagaku Kogyo Co., Osaka	American Cyanamid Co., U. S.	Insecticides—Parathion (manufacture)	15 years	B
Sept. 1, 53	Ishihara Sangyo Co., Osaka	Dow Chemical Co., U. S.	Plant hormone consisting of 4-chlorophenoxy acetic acid (manufacture)	14 years	B′
Sept. 1, 53	Nissan Kagaku Kogyo, Tokyo	Dow Chemical Co., U. S.	Plant hormone consisting of 4-chlorophenoxy acetic acid (manufacture)	14 years	B′
Nov. 17, 53	Sumitomo Kagaku Kogyo, Osaka	Farbenfabriken Bayer A.G., Germany	Insecticides (manufacture)	14 years 9 months	B
March 2, 54	Lederle (Japan), Ltd., Tokyo	American Cyanamid Co., U. S.	Acromycin (tetracycline products or tetracycline compounds) (manufacture)	15 years	C
March 16, 54	Sankyo, Tokyo	Løvens Kemiske Fabrik, Denmark	Penicillin aminoester (Leocillin) (manufacture)	5 years	C

Tables continued on p. 34

technically equipped to produce them domestically. Merck will provide technical know-how on the manufacture of cortisone under a 15-year royalty accord.

Another foreign project calling for investment in pharmaceuticals was approved in June, though actually it represents expanded rather than new investment. Pfizer Corp. of Panama, a holding company of Charles Pfizer & Co. (Brooklyn), is setting up a plant with its 50-50 partner, Taito Co.—the new firm to be called Pfizer-Taito Co., Ltd.—for the manufacture of tetracycline and Terramycin. The $278,000 poured into this project doubles Pfizer's investment in Japan, should begin to pay off sometime next January. Under a 15-year technical assistance agreement, Pfizer will receive royalties for know-how provided the Japanese firm—from 5.5% of net sales for bulk imports to 10% for manufactured products.

But beyond this, government officials say that no other foreign capital or technical investment in pharmaceuticals is required in the immediate future since manufacture of most important drugs in Japan already involves aid from abroad. (And there are few new patented drugs not now being produced in Japan that interest the Japanese government or manufacturers at present.)

Production and demand are, in general, in good balance, with output lagging behind—largely due to a lack of raw materials—only in the cases of PAS-Na and PAS-Ca, demand for which is rapidly increasing. Import of antibiotics last year amounted to $4,225,000, but is expected to drop some 30% this year as a result of technical tie-ups with foreign companies, mostly American. And though $2 million in vitamins ($1.6 million estimated for this year) and $264,000 in alkaloids were also imported last year, few other overseas pharmaceutical purchases were made.

Outlook for U.S. investment in petrochemicals, on the other hand, is relatively good—especially if a technical tie-up is involved in the agreement.

This is the one new industry the Japanese government has decided to push within the next year. Export markets, particularly in southeast Asia, are assured; few raw materials will have to be imported.

The government, in petrochemicals alone, is openly encouraging foreign loans, as well as technical aid, and even some capital investment. It will even permit imports of necessary production equipment — an important concession in import-tight Japan today. Moreover, it has agreed to exempt petrochemical companies from corporate taxes for a period of three years after inauguration of an enterprise.

It is officially hoped that at least five petrochemical companies will be operating in Japan by the end of 1958—all probably involving foreign technical aid, and one admitting capital investment.

Given top chance to slip under the wire:

• Japan's first petrochemical company—the Mitsui Petro-Chemical Industries, Ltd.—formed last July 1. Partners in this $2.8-million venture

FOREIGN . . . . . .

Tabular matter begins on p. 32

DATE OF APPROVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
March 16, 54	Pfizer-Tanabe Co., Osaka	Pfizer Corp., Panama	Tetracycline products (manufacture)	15 years	C
April 6, 54	Banyu Seiyaku, Tokyo	Bristol Laboratories, Inc., U. S.	Procain penicillin oil (manufacture)	14 years 6 months	A C
April 20, 54	Taito, Tokyo	Dow Chemical Co., U. S.	Method of use of dihydro acetic acid and acetic acid soda for food preservation	13 years 8 months	B′
July 20, 54	Nippon Merck Banyu Co., Ltd., Tokyo	Merck & Co., Inc., U. S.	Cortisone (tradename: Cortone) and hydrocortisone (tradename: Hydrocortone) (manufacture)	15 years	C
Aug. 17, 54	Yamanouchi Seiyaku, Tokyo	C. F. Bohringer und Sohne G. m. b. H., Germany	Chloramphenicol (manufacture)	10 years	C
Dec. 7, 54	Sumitomo Kagaku Kogyo, Osaka	American Cyanamid Co., U. S.	Malathion (manufacture)	11 years 11 months	B′
Dec. 7, 54	Nippon Soda Co., Tokyo	Dow Chemical Co., U. S.	Ovicidal and mikicidal compositions (manufacture)	15 years	B′

ORGANIC AND INORGANIC INDUSTRIAL CHEMICALS

DATE OF APPROVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
Dec. 7, 50	Mitsui Chemical Industries, Tokyo	American & Far Eastern Engineers, Inc., U. S.	Polyvinyl chloride (manufacture)	4 years 3 months	B
Dec. 21, 50	Toyo Koatsu Kogyo, Tokyo	American & Far Eastern Engineers, Inc., U. S.	Urea resin (manufacture)	4 years 3 months	B
Jan. 9, 51	Japanese Geon Co., Ltd., Tokyo	B. F. Goodrich Chemical Co., U. S.	Polyvinyl chloride (manufacture)	15 years	A′ B
Feb. 9, 51	Japan Reichhold Chemicals, Inc., Tokyo	Reichhold Chemicals, Inc., U. S.	Synthetic resins, special pigments and chemicals suitable for paint and varnish industry (manufacture)	11 years 11 months	B A′
April 12, 51	Shinetsu Kagaku Kogyo, Tokyo	American Cyanamid Co., U. S.	Calcium cyanide (manufacture)	8 years 5 months	B
April 21, 51	Sumitomo Kagaku Kogyo, Osaka	American Cyanamid Co., U. S.	Meramine resin (manufacture)	15 years	A′ B
April 21, 51	Kurashiki Rayon, Kurashiki	Les Usines de Melle S.A., France	Technique to recover and concentrate acetic acid	14 years 6 months	B
June 20, 51	Osaka Kinzoku Kogyo, Osaka	E. I. du Pont de Nemours & Co., U. S.	Freon gas (manufacture)	5 years 9 months	B
June 23, 51	Sumitomo Kagaku Kogyo, Osaka	Chemical Construction Corp., U. S.	Catalyst for methanol synthesis (manufacture)	10 years	B
Aug. 1, 51	Monsanto Kasei Kogyo, Tokyo	Monsanto Chemical Co., U. S.	Polyvinyl chloride, plasticizers, etc. (manufacture)		B
Aug. 23, 51	Nippon Carbide Industries, Tokyo	Ciba Ltd., Switzerland	Melamine resin (manufacture)	7 years 7 months	B
Aug. 23, 51	Denki Kagaku Kogyo, Tokyo	Ciba Ltd., Switzerland	Melamine resin (manufacture)	7 years 7 months	B
Sept. 5, 51	Toyo Ink Seizo, Tokyo	Interchemical Corp., U. S.	Printing ink and its raw materials (manufacture)	10 years	A′ B
Sept. 20, 51	Nissan Kagaku Kogyo, Tokyo	Hooker Electrochemical Co., U. S.	Sodium hydroxide and chlorine compound by electrolysis of alkali chloride (manufacture)	10 years 10 months	B

*Letters in remarks column indicate:

A—Direct contribution to improvement of international payments
B—Direct contribution to development of heavy industries
C—Direct contribution to development of public works
A′—Indirect contribution to improvement of international payments
B′—Indirect contribution to development of heavy industries
C′—Indirect contribution to development of public works

Tables continued on p. 36

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2853

Tabular matter begins on p. 32

DATE OF APPPOVAL	JAPANESE COMPANY	FOREIGN INVESTOR	KIND OF TECHNICAL AID	PERIOD OF CONTRACT	REMARKS*
Sept. 20, 51	Kyowa Hakko Kogyo, Tokyo	Commercial Solvents Co., U. S.	n-Butyl alcohol acetone and ethyl alcohol (manufacture)	5 years	B
May 14, 52	Nissan Kagaku Kogyo, Tokyo	"Montecatini," Societa Generale per l'Industria Mineraria e Chimica, Italy	(A) Urea by new Fauser process (B) synthetic ammonia (manufacture)	15 years	B
May 14, 52	Asahi Dow, Tokyo	Dow Chemical International Ltd., U. S.	Vinylidene chloride synthetic fiber (tradename: Saran) (manufacture)	15 years	B
May 14, 52	Nippon Soda Co., Tokyo	Master Builders Co., U. S.	Cement 10 (manufacture)	years	B
Oct. 14, 52	Ishihara Sangyo, Osaka	Glidden Co., U. S.	Titanium chloride (manufacture)	6 years 11 months	A B
March 31, 53	Nippon Titanium, Tokyo	R. S. Aries & Associates, Inc., U. S.	Titanium chloride (manufacture)	7 years 10 months	A B
March 31, 53	Shin-etsu Chemical Industries, Tokyo	International General Electric Co., U. S.	Silicone (manufacture)	6 years 9 months	B
March 31, 53	Tokyo Shibaura Denki, Kawasaki	International General Electric Co., U. S.	Silicone (manufacture)	6 years 9 months	B
June 2, 53	Nissan Kagaku Kogyo, Tokyo	Monsanto Chemical Co., U. S.	Improvement of textiles by colloidal silicate solution	14 years 5 months	B′
Nov. 17, 53	Nissan Kagaku Kogyo, Tokyo	"Montecatini," Societa Generale per l'Industria Mineraria e Chimica, Italy	Fauser oil gasification process	15 years	B
Oct. 19, 54	Matsushita Denko, Osaka	St. Regis Paper Co., U. S.	Plastic injection molded product and laminated product (manufacture)	5 years	B′
Dec. 10, 54	Shin Nippon Nitrogenous Fertilizer Co., Osaka	"Montecatini," Societa Generale per l'Industria Mineraria e Chemica, Italy	Fauser oil gasification process	15 years	B

OTHER CHEMICALS

Oct. 27, 50	Ferro Enamel (Japan), Ltd., Osaka	Ferro Enamel Corp., U. S.	Porcelain for enameled ware, and ceramic glaze (manufacture)	10 years	A′ B′
June 25, 52	Pacific Projects, Tokyo	American Chemical Paint Co., U. S.	Boiler inhibiter "Rodin" (manufacture)	9 years 4 months	B′
Dec. 23, 52	Nippon Paint, Osaka	American Chemical Paint Co., U. S.	Metal finishing chemicals (manufacture)	9 years 7 months	A′ B′
Feb. 3, 53	Mitsubishi Kasei Kogyo, Tokyo	Barsky & Strauss Inc., U. S.	Information and general research	1 year	C
March 3, 53	Nihon Parker Rizing Co., Ltd., Tokyo	Parker Rust Proof Co., U. S.	Phosphate coatings for metal finishing (manufacture)	3 years	A′ B′
Sept. 1, 53	Ishihara Sangyo, Osaka	Glidden Co., U. S.	Latex emulsion paint and latex enamel paint (manufacture)	7 years	B′
Dec. 1, 53	Fuji Camera Film, Kanagawa Pref.	Rowland S. Pottor, U. S.	Printing paper (manufacture)	1 year 4 months	A
May 18, 54	Toyo Ink Mfg. Co., Tokyo	Interchemical Corp., U. S..	Coloring matter for textile and industrial paints (manufacture)	10 years	A′
Oct. 5, 54	Nippon Shikizai Kogyo, Tokyo	Sinclair & Valentine Co., Ltd., U. S.	Printing inks, pigments and varnishes (manufacture)	10 years	A′
Dec. 21, 54	Dai Nippon Ink Mfg. Co., Tokyo	Sun Chemical Corp., U. S.	Printing inks (manufacture)	10 years	A′

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A′—Indirect contribution to improvement of international payments
B′—Indirect contribution to development of heavy industries
C′—Indirect contribution to development of public works

How Foreign Investment in Japanese Companies Now Breaks Down

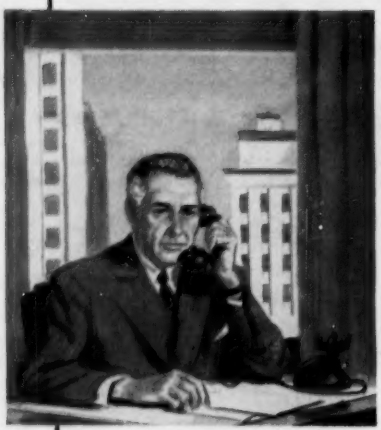
In Bonds Held

DATE OF APPROVAL	NAME OF COMPANY ISSUING BONDS	FOREIGN INVESTOR	VALUE OF FOREIGN INVESTMENT (IN 1,000 YEN)	NATURE OF FOREIGN INVESTMENT	PERIOD AND INTEREST RATE	REMARKS
May 29, 51	Japanese Geon Co., Ltd.	B. F. Goodrich Chemical Co., U. S.	63,000	U. S. dollars	5 years at 7%	Technical assistance and stock acquisition
Jan. 9, 52	Kyowa Hakko Kogyo	Hongkong Transportation Co., Ltd., Hong Kong	50,000	U. S. dollars	5 years at 5%	Stock acquisition
May 6, 53	Lederle (Japan), Ltd.	American Cyanamid Co., U. S.	36,000	U. S. dollars	6 years at 6%	With technical assistance and stock acquisition
May 6, 53	Takeda Pharmaceutical Industries, Ltd.	American Cyanamid Co., U. S.	54,000	Materials imported	5½ years at 4%	
May 28, 54	Ciba Seihin Co.	Ciba Ltd., Switzerland	30,096	U. S. dollars	4 years and 10 months at no interest	

In Stocks Held

DATE OF APPROVAL	NAME OF CO. ISSUING STOCK	FOREIGN INVESTOR	VALUE OF FOREIGN INVESTMENT (IN 1,000 YEN)	PERCENTAGE OF HOLDINGS	NATURE OF FOREIGN INVESTMENT	REMARKS
Oct. 27, 50	Ferro Enamel (Japan), Ltd.	Ferro Enamel Corp., U. S.	5,400	10%	Materials imported	With technical assistance; no remittance guarantee
Dec. 30, 50	Japanese Geon Co., Ltd.	B. F. Goodrich Chemical Co., U. S.	175,000	35%	Materials imported	With technical assistance as well as bond acquisition
Nov. 8, 51 Oct. 30, 53	Japan Reichhold Chemicals, Inc.	Reichhold Chemicals, Inc., U. S.	9,720 9,720	45%	Materials imported Equivalent in foreign goods	With technical assistance
Feb. 14, 51	Hokkaido Kohatsu	International Engineers, Inc., U. S.	6,000	1.38%	Materials imported	Number of actual acquisition shares: 9,100
Aug. 1, 51	Monsanto Kasei Kogyo	Monsanto Chemical Co., U. S.	612,000	50%	Materials imported	With technical assistance
Sept. 5, 51 May 18, 54	Toyo Ink Mfg. Co., Ltd.	Interchemical Corp., U. S.	2,500 7,812	23%	Equivalent in foreign goods	With technical assistance Total holdings: 231,250 shares
Oct. 3, 51 July 30, 52 June 2, 53	Kyowa Hakko Kogyo	Hongkong Transportation Co., Ltd., Hong Kong	30,000 30,000 30,000 ($60,000)	11%	U. S. dollars U. S. dollars U. S. dollars	Separate bond acquisition
May 14, 53	Asahi Dow	Dow Chemical International Ltd., U. S.	200,000	50%	Equivalent in foreign goods	With technical assistance
March 31, 53 March 16, 54	Pfizer-Tanabe Co.	Pfizer Corp., Panama	50,000 50,000	50%	U. S. dollars U. S. dollars	With technical assistance
March 31, 53	Nippon Titanium	R. S. Aries & Associates, Inc., U. S.	35,415 ($15,100)	7.5%	Materials imported	With technical assistance
May 6, 53	Lederle (Japan), Ltd.	American Cyanamid Co., U. S.	35,000	50%	U. S. dollars	With technical assistance as well as bond acquisition
July 20, 54	Nippon Merck Banyu Co., Ltd.	Merck & Co., Inc., U. S.	12,500	50%	U. S. dollars	With technical assistance
Oct. 5, 54	Nippon Shikizai Kogyo Co., Ltd.	Sinclair & Valentine Co., Ltd., U. S.	6,000	20%	Equivalent in foreign goods	With technical assistance
Dec. 21, 54	Nichibei Tokushu Toryo	Yates & Smart Paint Co., U. S.	6,650	35%	Materials imported	With technical assistance

Consult a Financial Specialist



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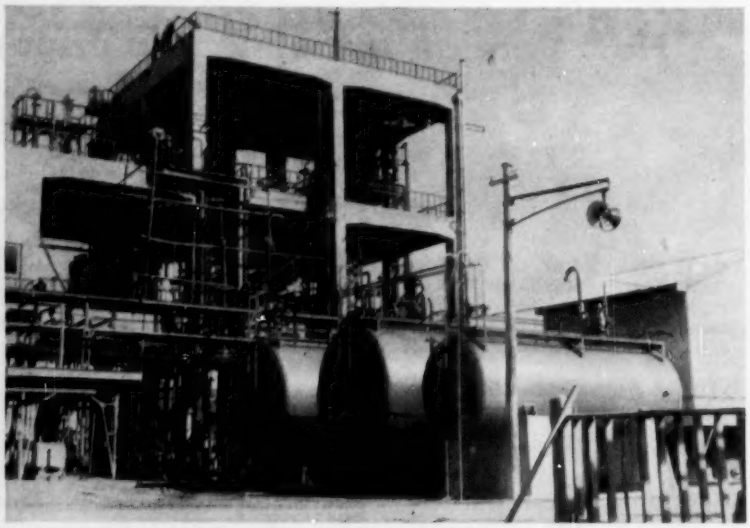

ASAHI DOW: Producing Saran since 1952; is now considering construction of polystyrene units, with a rated capacity of 3,300 tons/year.

are seven ex-Mitsui concerns—Mitsui Chemical, Toyo Koatsu, Milke Gosei Synthetic Industry, Mitsui Mining, Mitsui Mining & Smelting, Toyo Rayon, and the Mitsui Bank—and Koa Oil Co. A $1.2-million technical aid contract with Karl Ziegler of West Germany is now under consideration, will probably receive government approval soon.

• A second deal is being negotiated with Distillers Co. of Britain for use of its phenol- and acetone-from-cumene process.

The company expected to be formed as a result will (it's hoped) start operating within 2 years, will produce polyethylene (3,600 tons annually), ethylene glycol (2,400 tons), acetone (4,320 tons), and phenol (7,200 tons), as well as ethylene oxide, liquid propane, solvent, DMT, urea, and ammonium sulphate.

• Maruzen Oil Co., an independent petroleum firm, which is scheduled to embark on a petrochemical undertaking this autumn, will probably get technical assistance from the Chemical Project Assn. of America. The technical aid agreement, which is expected to be signed soon, calls for Maruzen to pay about $35,000 for CPA assistance and to import some $25,000 worth of equipment from the U.S.

Maruzen will invest $1.72 million for the production of propane (2,700 tons yearly), isopropyl alcohol (2,400 tons), butane and isobutylene (10,000 tons), isobutyl alcohol (4,560 tons), and methyl-ethyl alcohol (3,600 tons).

• Nippon Oil Co., which hopes to spend about $2.5 million on a plant that will turn out 3,500 tons of acetone, 2,000 tons of isopropyl alcohol, and 2,300 tons/year of liquefied petroleum gas, is currently negotiating for a licensing agreement with Stone & Webster Co. (New York) providing for use of a Distillers Co. patent involving know-how design of equipment.

• Mitsubishi Oil Co., Ltd., which plans to set up a $2.7 million plant for the production of aromatic hydrocarbons at a rate of 10,000 tons/year,* is awaiting approval on a contract with Universal Oil Products (Chicago), which will offer technical aid on the udex extraction method.

• And Sumitomo Chemical Industries Co. is also thinking of setting up a petrochemical plant to produce polyethylene with foreign technical aid, but its plans are still vague.

Less Likely to Get By: Probably the project least likely to be accepted by the government is that proposed by Royal Dutch Shell Co.

Under terms incorporated in this proposal, Anglo-Saxon Petroleum Co., one of the three Shell group operating companies, would embark on an $11-million petrochemical scheme on a 50-50 basis with Shell's chemical affiliate, Mitsubishi Chemical Co., Shell

* Including benzol (4,000 tons), xyrol (3,000 tons), and toluols (3,000 tons).

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CO_2 is extensively used in the manufacture of both plastic sponge and foam rubber. Two of CO_2's most important applications in these fields include use as a foaming agent and as a neutralizing acid.

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FOREIGN . . . . . .

in addition to provide $1.4 million in technical aid.

Showa Oil Co., which is 50% owned by Anglo-Saxon, would provide oil products for the plant. It would also furnish half the $19.5 million to be invested in a new Shell-Showa oil refinery that would be closely linked with the petrochemical enterprise.

Despite its enthusiasm in pushing petrochemical ventures, the government does not look too kindly on the idea of a foreign firm—Shell—wielding 50% control of a new Japanese company, particularly when the items to be produced—acetone (3,000 tons annually) and isopropyl alcohol (2,000 tons)—are also to be manufactured by a fully Japanese firm (Nippon Oil).

Nevertheless, judging from past experience, this undertaking cannot by any means be counted out.

In addition to these petrochemical projects, several agreements concerning production of polystyrene, a plastic whose raw materials are partly derived from petrochemicals, will probably be passed by the chary Japanese government. Investment applications of three U.S. companies—Dow Chemical International, Monsanto Chemical, and Koppers Chemical—are particularly favored to get by.

Dow's investment would be an extension of its present 50% stake in Asahi-Dow Co., which, since it was formed in 1952 (in conjunction with Asahi Chemical Corp.), has been producing saran. The U.S. and Japanese firms would now each invest $278,000 in the new project—Asahi's share in cash, and Dow's in technical know-how.

In addition, Dow would lend to the joint company (on a 5-year, 2.5% interest basis) $472,000 for construction of its polystyrene plant. The latter would produce about 3,300 tons/year of the polystyrene from styrene monomer imported from the U.S.

Monsanto's investment, technically speaking, would be in the form of a 5-year $750,000 loan to Monsanto-Kasai Chemical Co., which was established by Monsanto and Kasai Chemical Co. in 1952 on a 50-50 basis to manufacture polyvinyl chloride. The loan, which would carry 2.5% interest annually, would be converted into stocks in the joint company within the next few years. Monsanto would receive royalties amounting to 2.5% of net sales. Two plants would be built, each producing 1,200 tons/year of PVC; raw materials would be provided by Monsanto.

Koppers Co. participation in a polystyrene project would be on a purely technical basis. Tekko-Sha Co., Ltd., would establish the new company with a capitalization of $694,000. Koppers would provide technical know-how, receiving royalties of 5% of net sales for 10 years; the new plant would produce 2,000 tons/year of polystyrene.

There is probably room for additional American investors in the petrochemical and related fields—particularly if they have technical aid to offer.

But outside of this the investment picture isn't encouraging.

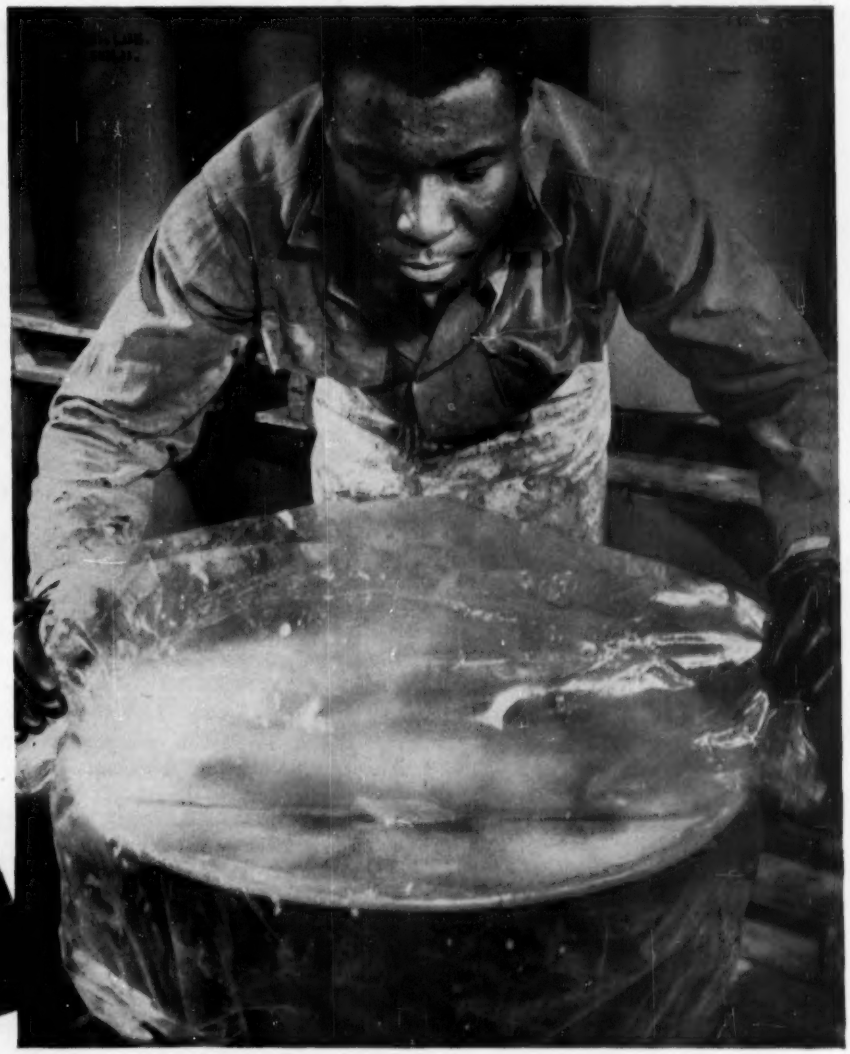
Several American companies, for example, have applications pending for technical or capital investment in the plastic fields, most of which stand less than a 50-50 chance of being approved by the government.

- Reflin Co., Inc. (Gardner, Calif.) wants a 5-year tie-up with Taiki Rubber Co. involving technical assistance in the manufacture of polystyrene pipe. Reflin would receive royalties of 3% of net sales and $25,000 as an initial payment.
- International General Electric Co. (New York) has asked approval of a technical tie-up with Zeolite Industrial Co. whereby it would receive 3.5% royalties on net sales for aid in producing ion exchange resin. (A similar 13-year contract between General Electric and Mitsubishi Chemical Industry Co. was approved last February.)

Dow Corning (Midland, Mich.) would like to invest capital in a new silicone plant with Sumitomo Chemical Co., Ltd. However, Sumitomo prefers that only technical aid be given.

In Industrial Chemicals: There is not much immediate possibility of investment in industrial chemicals, either. Still, a 5-year royalty agreement was approved in April whereby Magnus Chemical Co., Inc. (Garwood, N.J.) will furnish the Nippon Parker Rising Co. with technical aid in metal degreasing, metal cleaning, decarbonizing, paint removing, etc. Also, Coloramic Coatings Co. (Los Angeles) was given the green light in July to supply Kansai Paint Co. with technical aid in the manufacture of multicolored paint, also on a royalty

SAVINGS SHOW it pays to package in film made of BAKELITE Polyethylene



With a double liner of polyethylene film, this drum is filled with phosphoric acid. A pre-cut circle of polyethylene film is then placed over the top of the drum before clamping on the metal lid. Sealed drums can be handled by any conventional means. **Flexible Package Company,** Chicago, Ill., made these liners from Visqueen film made by **The Visking Corporation,** Terre Haute, Ind.

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That's the report of Time Chemical, Inc., Chicago, Ill., after two years' experience with drum liners made of film produced from BAKELITE Brand Polyethylene.

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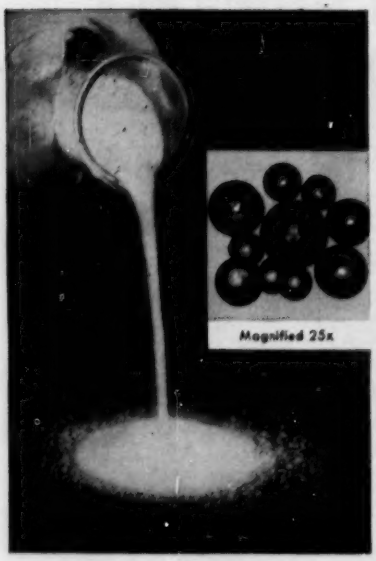

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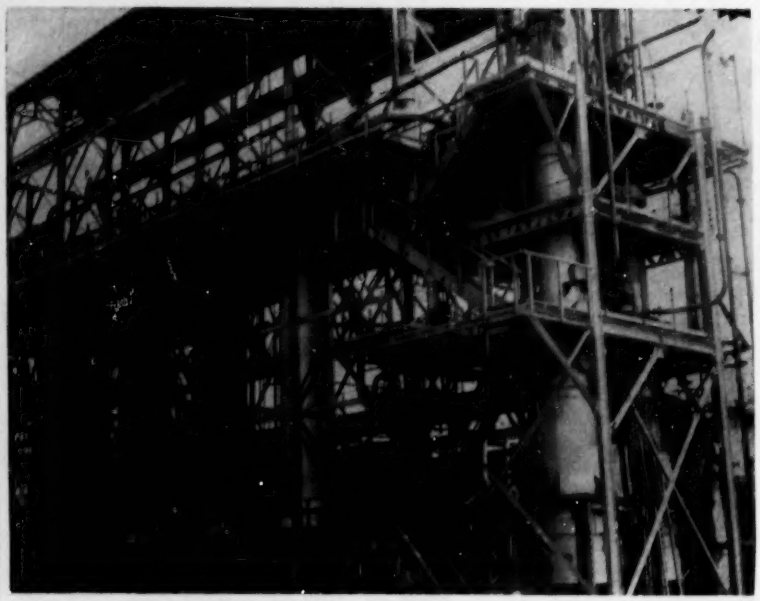


SUMITOMO AT NIIHAMA: Urea processing units were built by Chemical Construction, are now in full operation.

basis.

But capital investment prospects are virtually nil and further technical aid possibilities very weak.

In general, the Japanese supply of basic chemicals is now meeting demand, a situation that probably won't change very much in the near future. And some chemicals such as ammonium sulfate, calcium cyanide, calcium superphosphate, caustic soda, sodium carbonate, and calcium carbide are even being exported in fairly large quantities.

In Synthetic Fibers: Japan's synthetic fiber industry has excellent plants and technicians of its own and needs little more foreign aid than it's now getting.

Recent figures for 1954 tell the story: staple fiber: production, 456 million lbs.; demand, 318 million lbs.; exports, 138 million lbs. rayon—production, 185 million lbs.; demand, 105 million lbs.; exports, 75 million lbs. nylon, Vinylon, saran: production, 23.22 million lbs.; demand, 22.4 million lbs.; exports, 800,000 lbs.

Moreover, production in this field is now geared to meet increasing demand.

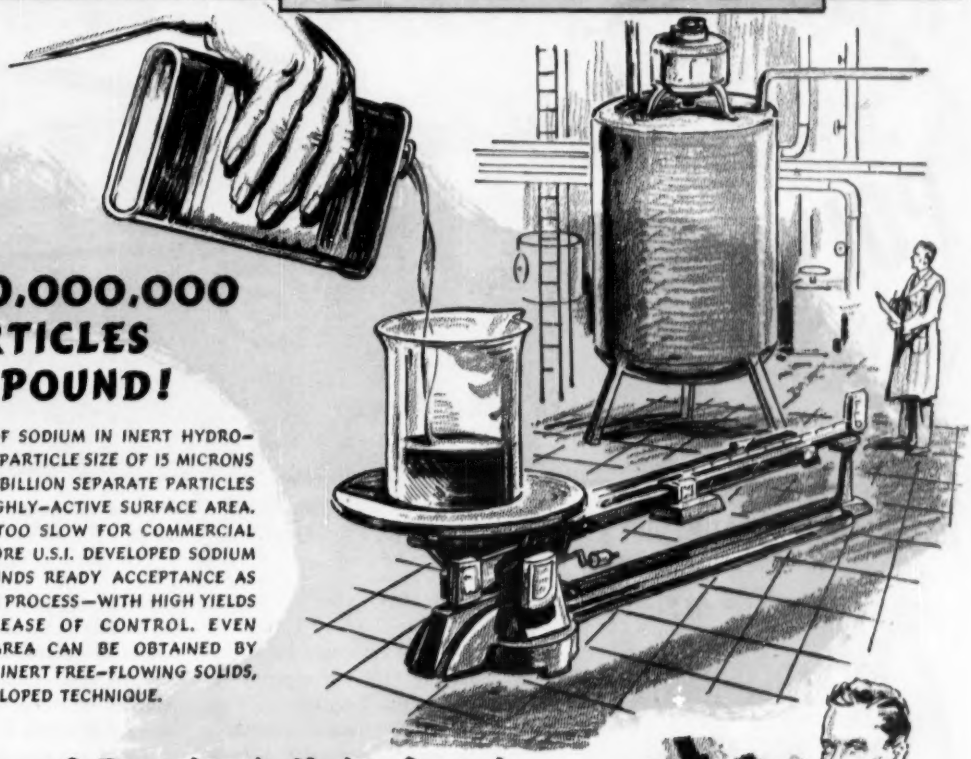
Thus, this year, production of nylon is expected to increase from 11.17 million lbs. to 20.21 million lbs., Vinylon from 8.75 million lbs. to 14.8 million lbs., and saran from 3.3 million lbs. to 4.86 million lbs. Exports of the three fibers, it is hoped, will reach 2.54 million lbs. this year and 4.25 million lbs. in 1956.

Within the next few years, however, technical aid, though probably not capital investment, may be needed in the manufacture of Orlon (to start in 1957), Stylon, and various specified vinyl products.

The glass-fiber field could be another investment possibility if the Japanese government decides to build up this industry. Bucking for this possibility: Owens-Corning Fibreglas Corp. (Toledo, O.), which has an application pending with the government calling for establishment of a joint firm with Asahi Glass Co. Owens-Corning's 40% investment would amount to $1.6 million in technical aid.

In Ag Chems: The agricultural chemical field also offers slim opportunities for foreign participation in Japan today. It is reported that Rohm & Haas Co. and Montrose Chemical Co. (Newark, N.J.) are interested in establishing such tie-ups, but only one technical aid contract in the field has so far been approved this year. That went to Imperial Chemical Industries, Ltd., of Britain, which was granted permission in April to license Mitsui Chemical to use two "weed killer" patents. (ICI receives royalties of 5%

keeping up with **SODIUM**



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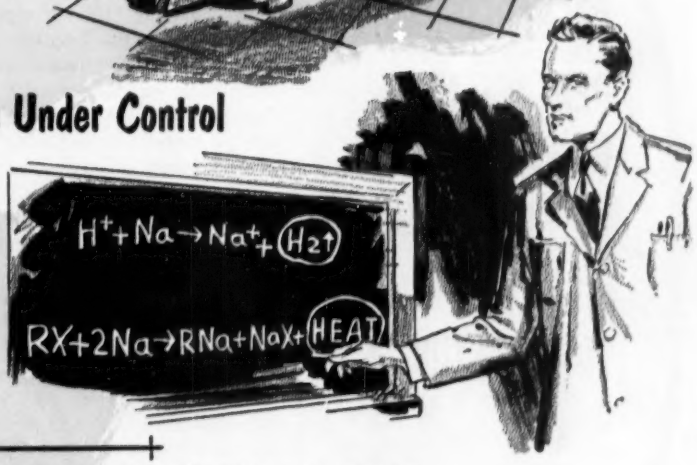

NEW WAY TO MAKE CATALYSTS HIGH-PURITY METALS...OR WHAT?

SINCE THE DEVELOPMENT OF SODIUM COATED SOLIDS BY U.S.I., HIGH YIELDS OF FINELY-DIVIDED TITANIUM, ZINC, IRON, COPPER, NICKEL, PLATINUM, ETC., HAVE BECOME POSSIBLE—NEW PROCESSES HAVE BECOME FEASIBLE ON A COMMERCIAL SCALE. SODIUM DISPERSIONS, TOO, HAVE BEEN USED TO REDUCE CERTAIN METAL SALTS. HIGHLY PURE METALS AND CATALYSTS CAN BE READILY PRODUCED. CAN YOU THINK OF OTHER APPLICATIONS?

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MONSANTO KASEI: With U.S. aid, potential additional vinyl chloride monomer output is 2,400 tons/year.

of net sales in sterling for a period of 15 years.)

Topping It Off: On top of such short odds, applying for investment in Japan means certain headaches for the applicant today. Before any company's proposal is worked out with a Japanese partner and approved by the Foreign Investment and other bureaus of the Ministry of International Trade and Industry, of Finance, and the Bank of Japan, two years or more of uncertainty and frustration have generally slipped past. And even if the proposal is finally approved, it's no guarantee that a company's worries are over.

To expect cheap labor in Japan today is a dire mistake. Workers are paid salaries of only $25-50 monthly. And in addition, they usually receive large bonuses and vast company welfare benefits—including free housing, lunches, medical treatment, summer and winter camps, and entertainment.

Moreover, most firms are greatly overstaffed due to the traditional reluctance of Japanese employers to fire employees (partly due to the unemployment problem and partly to the importance of "face"), even though they may be incompetent or no longer needed.

Such conditions, foreign investors have sadly discovered, do not make for maximum profits.

Another factor increasing production costs and decreasing profits is the fact that most raw materials, or the fuels to convert them into manufactured products, must be imported by Japan at relatively high prices. Only foreign firms that have raw material sources of their own can hope to operate in Japan at relatively low cost.

There are also difficulties to be met by companies planning to use their own personnel in operating plants in Japan.

For example; the government today frowns on ventures involving foreign employees, even in management and technical positions.

This attitude is reflected in efforts to discourage the presence of such employees by making it almost impossibly expensive for them to live in Japan. Next year, when special occupation tax provisions for foreigners go out of existence, most may well be taxed right out of the country.

Says one U.S. executive in Tokyo: "There's no question but that the Japanese today are trying desperately to rid themselves of foreigners they feel are detrimental to the country. But they're doing it in a fair way. They're just not going to grant any more special privileges. And with Japanese law stacked against those with high living standards, the result is inevitable."

A less justifiable, but just as real, problem to be reckoned with: the traditional Japanese reluctance to approve anything new which might conflict with previous policy.

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FOREIGN. . . . . .

ence could be interpreted as the government's losing face by admitting it made a mistake originally.

The disadvantages of doing business in Japan, however, are offset (in the minds of firms already ensconced there) by a number of solid advantages—from the investment standpoint.

Liberal Guarantees: For one thing, Japan's Foreign Investment Law provides for very liberal remittance guarantees which, experience has indicated, are scrupulously backed by the government. Under terms of the law (established in 1950), the government guarantees the right of foreign investors to remit abroad 100% of their profits or royalties at any time. Only restriction: proceeds from sold stock can't be sent out of Japan until two years after date of sale—and then at a rate of 20% annually. Few other soft-currency countries either offer or stand by such guarantees.

Moreover, in Japan today, foreign-owned companies are required to pay the government a tax of only 10% on royalties earned*—compared with a 20% tax on Japanese firms.

Also: most alien companies working in Japan today are earning a reasonable return on their investment—usually around 10%.

Future Beckons: Seldom expressed, but possibly most enticing, lure beckoning foreign chemical investors to Japan is the potential vast Chinese market that could open up at any time. Pressure in Washington to lower the wall has been building up for many months; insiders now privately believe that trade barriers will be lifted at "the moment" most politically provident for the Eisenhower Administration. When that happens, one chemical firm is frank to admit, the rush to establish plants in Japan will be on in earnest.

But latecomers may find that the door (except in special instances) has already slammed shut.

U.S. businessmen contemplating investment in Japan henceforth are sure to have a difficult chore in realizing their plans.

And if the long Japanese government tradition—of applying pressure gradually until its adversary cracks—is repeated this time, their opportunities aren't going to get any better.

They're virtually sure to get worse.

*That figure may be raised to 15% in the near future.

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Hydrofluosilicic Acid
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Metallic Fluoborates
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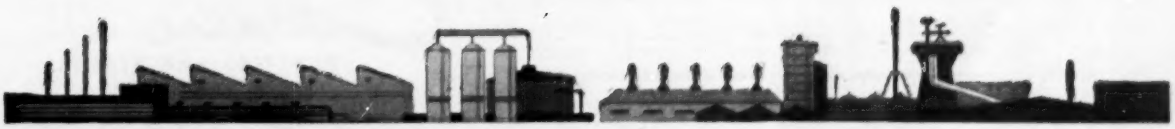

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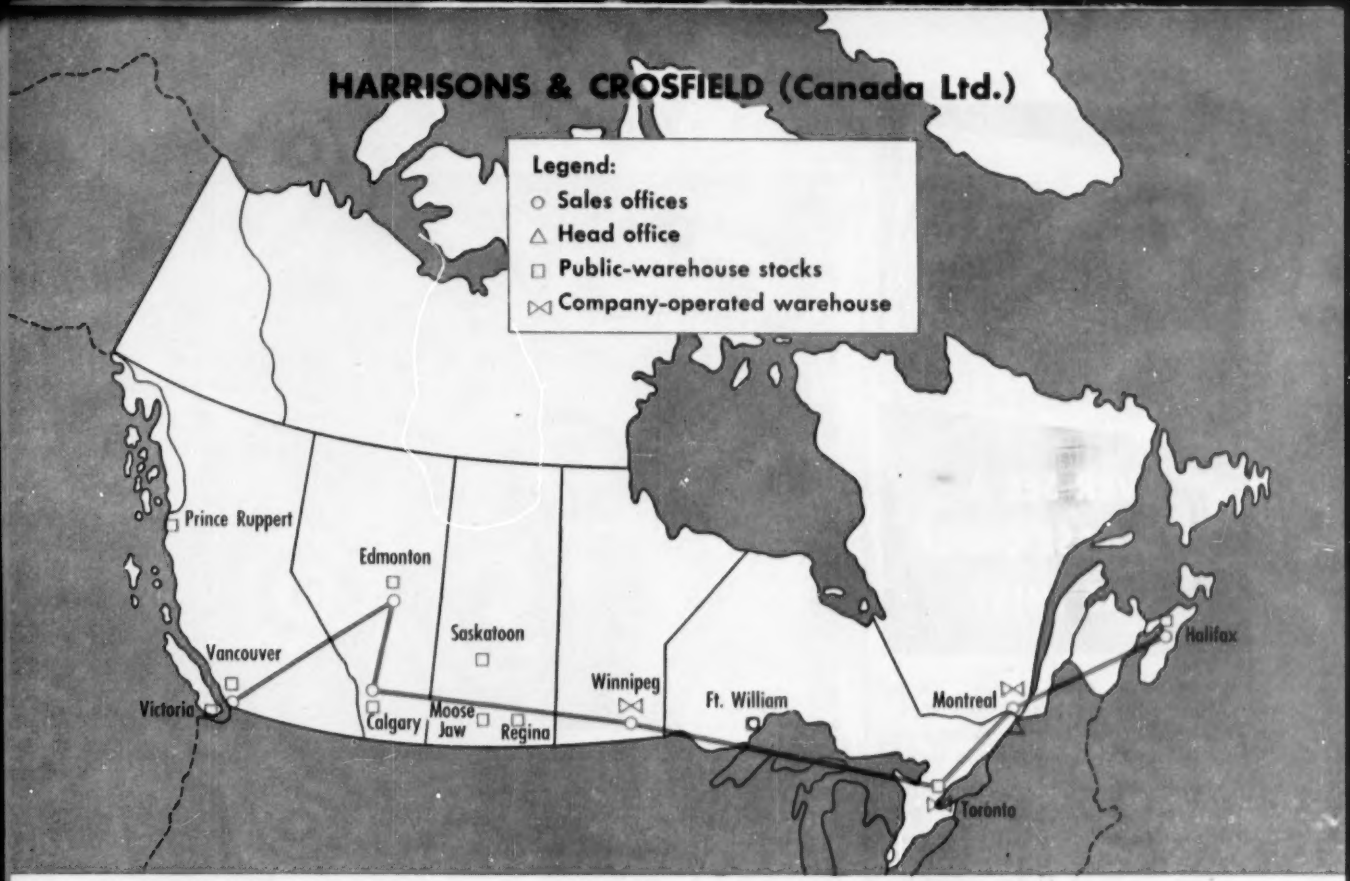

Regional Set-Up Pays Off in Canada

One way to sell in Canada: locally directed distributors, centralized financing and technical service, product lines geared to locale, do the job for Harrisons and Crosfield.

By and large, the typical chemical distributor is content with a limited territory—often with limited groups of related industries. Remote markets and coast-to-coast coverage, technical service laboratories, market research, and college grants-in-aid, most dealers leave to the supplier. But north of the Niagara frontier, there's one distributor that not only delves into the manufacturer's usual functions, but merchandises rubber, steel, and laundry baskets as well.

Half-century-old Harrisons & Crosfield (Canada) Ltd., one of three subsidiaries of its British parent* active in North America, will handle most anything it finds a market for, considers itself a distributor of industrial raw materials rather than chemicals. Chemicals, naval stores, oils, and latex rubber form the bulk of the firm's line, much of it imported.

* The parent firm, Harrisons & Crosfield Ltd., London, England, also runs Dillons Chemical Ltd. (Canada) and Harrisons & Crosfield (America), Inc.

Although probably the largest distributor of its type in Canada, H & C modestly makes no such claim, keeps its actual sales figures closely guarded. A network of 7 sales offices, 13 warehouse points, and a technical service laboratory (*see map*) provide one measure of the firm's size. Its blue-chip list of principals offers another: Dow Chemical of Canada Ltd.; Diamond Alkali Co.; Canadian Chemical Co., Ltd.; Glidden Co.; Hercules Powder Co., and National Aniline are just a few.

The present size of the company stems from an orderly if somewhat opportune growth. In 1920, original tea-trading interests were expanded to include steel, resins and gums. Acquisition of Wilson, Paterson, Gifford Ltd. in 1935 broadened H & C into naval-stores pigments and vegetable oils. Dry-cleaning materials, alkalis, silicates, and general chemicals were tacked on in 1938 with the addition of Beaver Soap & Chemicals Ltd.'s distribution facilities, and all chemical interests were consolidated with formation of the present company. Last year, as fertilizers continued to become a "hot demand" item, the firm became sole distributors for Sherritt Gordon Mines Ltd.'s by-product chemicals and fertilizers. Together, Sherritt Gordon and H & C are sponsoring research at prairie universities to study the use of anhydrous ammonia and ammonium sulfate on prairie soils.

H & C's growth, however, has been more than judicious purchase of chemical companies and expansion. Rather, the firm ascribes much of its success to the parent company's 96-year-old philosophy: "We . . . strive vigilantly to watch their [the customers'] interests as well as our own. . . . vend on the best terms the market will admit." This philosophy has led to an organization keenly keyed to industries in the various parts of Canada.

Chemical Federation: Core of the H & C operation is a regional approach. Sales offices and warehouses cater to the major industries of the particular area. Thus Winnipeg sells

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Personal Service and Prompt Shipments from 30 Nation-Wide Branches and Sales Offices.

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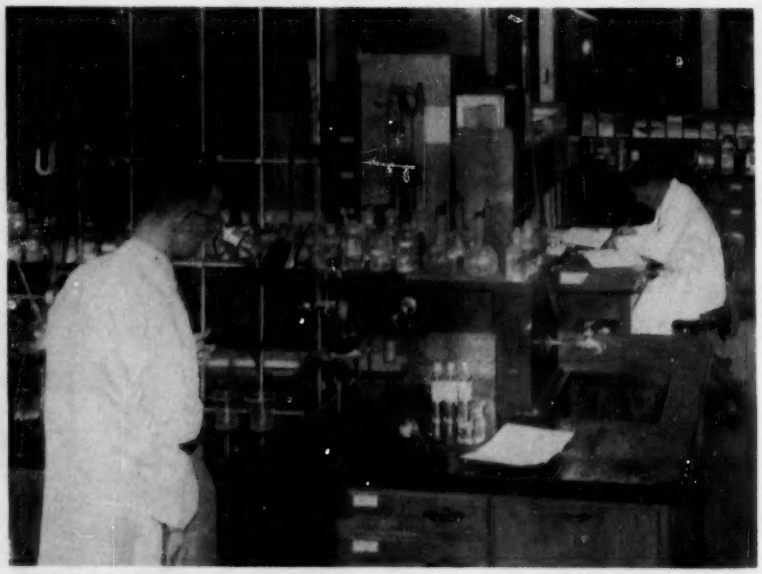


SILENT SELLING: Formulation with domestic Canadian chemicals axes costs.

farm chemicals to a 40-million-acre area; chemicals for lumbering, fishing and mining move through Vancouver; and Montreal and Toronto push materials to the paint, rubber, adhesives, plastics, and textile industries in Ontario and Quebec.

Individual offices operate much like independent distributors. Branches regulate their own warehouse stocks, place orders for Canadian and U.S. goods, plan their own sales campaigns. Finance, import details, traffic problems are shouldered by the head office in Montreal.

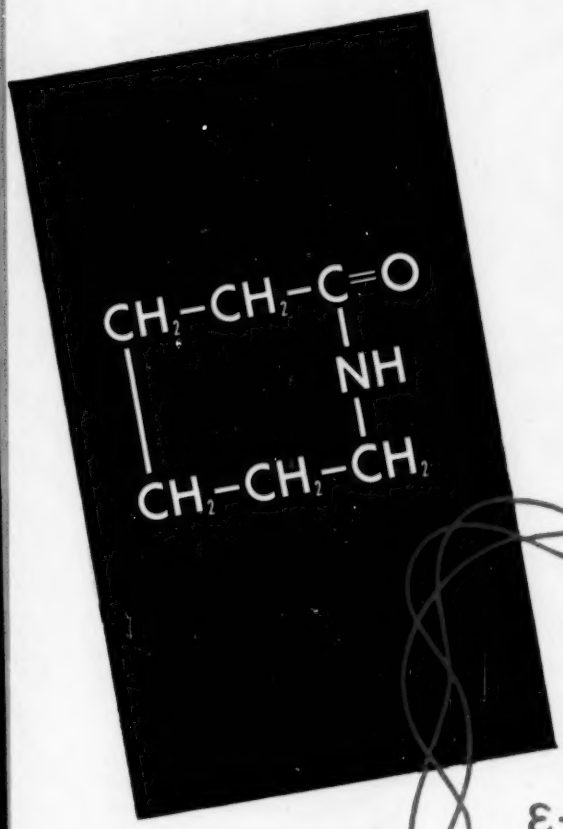
Regional directors—in Montreal, Toronto, Winnipeg, and Vancouver—pilot the branches. Thus, the Vancouver director, responsible for British Columbia and Alberta, watches chemical sources in Western U.S., works out freight-rate problems, moves materials into the area at—or below—competitive prices. Such a management organization, claims H & C, makes for fast action and response to market changes, utmost flexibility.

Specialist salesmen rather than general-line vendors are the rule, but men in smaller branches, two-man staffs are "jacks of all trades." About half the sales staff is technically trained, and most professionals have long-standing familiarity with assigned regions. French-speaking salesmen are a must for Quebec, of course.

Technical service: To spark its far-flung chain, H & C maintains a special technical division in Toronto. Part of its work:

- Development of new applications.
- Quality control (particularly on imported vegetable oils).
- Formulation—e.g., adjusting U.S. formulas to Canadian units.
- Cost-cutting. This is sometimes done by substituting Canadian materials and/or chemicals handled by H & C for those in original formulations.
- Market research. This, a regular part of the division's work, is done for principals as well.
- Branch-office assistance. A special "roving commission" updates salesmen and offices, proffers technical advice, orders laboratory work, briefs sales staffs on needs of new customers.

Dominion Problems: Marketing chemical wares across the border presents a passel of problems—some uncommon to U.S. sales managers. Climate and geography are different; e.g., icing of inland waterways boosts the price of winter-delivered imports considerably by long rail hauls. To "vend at the best terms," H & C must carefully weigh storage charges of summer-ordered goods vs winter delivery. Salesmen check customers to ensure adequacy of imported materials before the St. Lawrence freezes. Mines in northern Saskatchewan and the Northwest Territories can be served only in the summer, except by airfreight. Shorter growing seasons



National Aniline Announces

First American Tonnage Production

of an interesting reactive intermediate

NATIONAL®

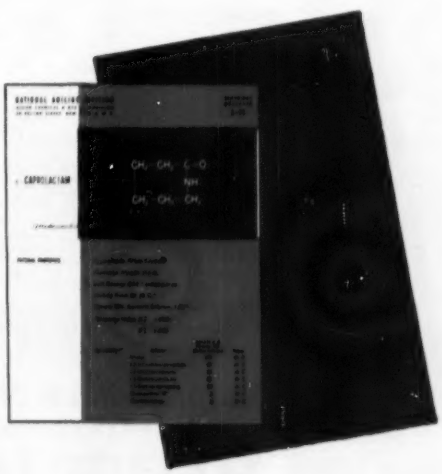
ε-CAPROLACTAM

(2-Oxohexamethylenimine)

Available for the first time in large tonnage, this high-purity ε-Caprolactam should find important uses in new organic chemical developments. Our modern Hopewell, Va. plant has ample production to supply projected requirements and our output can be further expanded to meet any foreseeable commercial need at attractive volume prices.

WRITE FOR TECHNICAL BULLETIN I-14

To assist prospective users of this unusual 6-carbon chemical, National CAPROLACTAM, we have prepared a 12-page brochure containing complete physical properties, known chemical reactions, suggested uses, and a bibliography. Samples and additional technical help are freely available to those whose work may develop new uses for National CAPROLACTAM.



NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N.Y. • HAnover 2-7300

Boston 16, Mass., 130 Causeway St.	CApitol 7-0490	Charlotte 1, N.C., 201-203 West First St.	CHarlotte 3-9221
Providence 3, R.I., 15 Westminster St.	DExter 1-3008	Richmond 19, Va., 6 North Fifth St.	Richmond 7-1930
Philadelphia 6, Pa., 200-204 S. Front St.	LOmbard 3-6382	Columbus, Ga., Columbus Interstate Bldg.	Columbus 3-1029
Los Angeles 58, Cal., 4814 Loma Vista Ave.	LOgan 8-2257	Greensboro, N.C., Jefferson Stand. Bldg.	GReensboro 2-2518
San Francisco 5, Cal., 517 Howard St.	SUtter 1-7507	Chattanooga 2, Tenn., James Bldg.	CHattanooga 6-6347
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Toronto 2, Can., 137-143 Wellington St. W. Empire 4-6495

KAY-FRIES

DIETHYL MALONATE

$CH_2(COOC_2H_5)_2$

A new high purity DIETHYL MALONATE has been developed by the Kay Fries laboratories. Kay Fries DIETHYL MALONATE, an old stand-by of the organic chemist, is available in commercial quantities.

Through this improved quality, development of new uses will be aided, and the operation of established processes made more efficient.

An active methylene group in a dicarboxylic acid ester is of particular interest and has been responsible for much of its present use in the manufacture of pharmaceuticals, including barbiturates and anti-malarials.

KAY FRIES SPECIFICATIONS

purity	99.0% min.
nitrogen	0.01% max.
acidity	0.1% max. as malonic acid

TYPICAL REACTIONS

$2CH_2(COOEt)_2 + 3RX \xrightarrow{Na} CHR(COOEt)_2 + CRR(COOEt)_2 + 3HX$
halogen cd. — mono- and di- substituted malonic esters

$CH_2(COOEt)_2 + HC(OR)_3 \xrightarrow{catalyst} ROCH = C(COOEt)_2 + 2C_2H_5OH$
trialkyl orthoformate — alkoxy-methylene malonic ester

$CH_2(COOEt)_2 + RRCO \xrightarrow{catalyst} RRC = C(COOEt)_2 + H_2O$
aldehyde or ketones — disubstituted methylene-malonic ester

$CH_2(COOEt)_2 + NH_2CONH_2 \longrightarrow NHCOCH_2CONHCO + 2C_2H_5OH$
urea — barbituric acid

(Many substituted malonates may be hydrolized and decarboxylated to the corresponding subst. acetic esters.)

American-British Chemical Supplies, Inc.
Selling Agents For
KAY-FRIES CHEMICALS, INC.
180 Madison Avenue, New York 16, N. Y. • MUrray Hill 6-0661

concentrates demands for fertilizers, pesticides, and dairying chemicals. Fortunately, important market areas (Ontario and Quebec) are less seasonally affected.

International commodity freight rates, too, can plague Canadian sellers, and H & C collided head on with them in gearing to sell Sherritt Gordon's fertilizers in the U.S. through the U.S. subsidiary. Skillful dealings with Canadian and U.S. carriers, however, will put Canadian fertilizer into a potential 24 Western states.

Ahead: It figures that H & C will slice off its share of Canada's solid future. Right now, the company is pondering new sales offices (probably in Saskatchewan) and a special agricultural division to assist branch offices with ag-chem selling.

And, it's likely such expansion will see H & C "watching their interests as well as our own."

Selling Soft Water

Education of the average homeowner in the advantages of water-softening received more impetus this week with the introduction by Dow Chemical Co. (Midland, Mich.) of its new color film "Soft as a Cloud." A non-commercial, public-service type film, it seeks to show the public the costliness and disadvantages of hard water.

Utilizing both animation and "live" actors, the film aims at the practical needs of the lady of the house, and is designed for use by extension service home economists, club groups and TV homemakers' programs. It runs about 25 minutes.

Educationally there is much to be done in the field of home-water softening, and Dow's film is one of the most ambitious single projects yet undertaken by any of the four ion-exchanger manufacturers. Potentially there is a wide market since a large portion of the U. S., notably the entire Midwest, Southwest, and parts of the Northeast, is hard water area. Dow feels that only about five percent of the market has yet been tapped.

Dow plans to distribute the film through Modern Talking Pictures, Inc. (New York), a firm that specializes in the distribution of industrial films, and through its own media. Initial showings are coinciding with National Soft Water Week, September

A plant in Louisiana uses U. S. USCOLITE® plastic pipe to carry vinegar from processing to storage vats, and from storage vats to pasteurizer and then to bottler. Previously, metal pipe had been used, and averaged *2 years' service life.* But USCOLITE has been in use steadily for over 5 years and shows not the slightest sign of corrosion or wear...gives every sign of lasting indefinitely. It imparts no odor, taste, discoloration or contamination. USCOLITE gives full flow at all times—never clogs up.

USCOLITE *pipe is tough—has extremely high impact strength.* USCOLITE pipe, fittings, flanges, valves (Hills-McCanna) come in the broadest and largest line of stock sizes on the market.

Look to USCOLITE pipe whenever corrosion is a problem. USCOLITE is doing great work in chemical processing plants, paper mills, food processing plants—to name but a few industries. Extremely tough but light in weight, it can be easily threaded and installed with conventional tools. For replacements or a completely new pipe installation, get in touch with any of the 27 "U. S." District Sales Offices or write address below.

"U.S." Research perfects it..."U.S." Production builds it...U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

Here's money-saving news

from the laboratory of a major west coast refinery*

Di-tertiary-butyl-para-cresol is the most economical, most effective antioxidant for use in both regular and premium gasolines. That's the conclusion reached by the research department of a west coast refinery after several years of exhaustive tests on various types of gasoline inhibitors.

This outstanding additive actually prevents the formation of gum in gasoline, resulting in a *cleaner* gasoline and a *cleaner* engine.

In addition, production costs can be considerably reduced by diverting distillates to less expensive and less severe finishing operations, since di-tertiary-butyl-para-cresol can be added early in the process to gasoline streams *before* the unstable components come in contact with air. This insures the maximum protection at least cost. Further protection is afforded in that it effectively retards deposit formation in the automotive engine.

Koppers is a major manufacturer of di-tertiary-butyl-para-cresol, which is sold under the trade name of **dbpc.**® **dbpc** is available in two grades:

TECHNICAL GRADE—
finds additional application as an economical antioxidant in aviation fuels, transformer oils, lubricating oils, plastics and rubber.

FOOD GRADE—
protects foods containing fats and oils from rancidity due to oxidation. Effectively stabilizes these edibles in texture, odor, color and flavor for as little as 1 part **dbpc** to 10,000 parts food product. Also finds use in food packaging materials.

*Name supplied on request

KOPPERS COMPANY, INC.
Chemical Division, Dept. CW-95, Pittsburgh 19, Pennsylvania

KOPPERS®

Koppers Chemicals

SALES OFFICES: NEW YORK • BOSTON • PHILADELPHIA
ATLANTA • CHICAGO • DETROIT • HOUSTON • LOS ANGELES

12-18, and are being made to about 100 water-softening organizations. From then on much of the dissemination will be through an assortment of mailing lists, including Dow's own 11,000 name list of home economists, public service institutions, college departments, schools, clubs, and the like.

Other manufacturers, Rohm & Haas (Philadelphia), Permutit (New York) and Chemical Process Company (San Francisco) are also pushing the market, mostly through media in the nature of demonstrations, demonstration kits, gimmicks, brochures, lecture materials and reference files. Dow, Rohm & Haas, and Chemical Process manufacture only the resin chemical compounds, while Permutit, vertically integrated, manufactures equipment in addition to the compounds. All four, of course, are interested in the consumer market for water-softening equipment of the type usually installed as part of the home-owner's plumbing facilities.

•

Sales Retrenchment: Corrosion Chemical Co. (Los Angeles, Calif.) is discontinuing formulation and sales of epoxy resins.

•

Expanding Sales Coverage: Chorney Chemical Company (Montreal) has been appointed sole Canadian agent for the Wilson Laboratories, division of Wilson & Co., Inc. (Chicago), manufacturers of animal-glandular derivatives and enzymes.

• C. J. Osborn Co. (Nassau, N. Y.) is now sole sales representative in the U. S. for Sachtleben A. G. fuer Bergbau und Chemische Industrie (Cologne, Germany), manufacturers of 60% zinc sulphite and blanc fixe.

• Bee Chemical Co. (Chicago) has taken over sales of Premier Thermo-Plastics Co.'s (Jeffersontown, Ky.) vinyl extrusion and injection molding compounds.

• National Lead Co. (New York) has named Sued-Chemie (Munich, Germany) sole sales representative in Germany for its line of jelling agents for polar, nonpolar, and middle polarity liquids.

• E. H. Sargent & Co. (Chicago) is building a new warehouse and office in Detroit to handle laboratory instruments, apparatus and reagent chemicals.

• American Potash & Chemical

... as corrosive as hydrochloric acid

... as critical as caustic soda

... as volatile as chloroform

as viscous as molasses

are stored safely in General American tank storage terminals

Easy-to-handle liquids and problem liquids alike . . . they're all in a day's work for the men at General American terminals. Storage capacity of over half-a-billion gallons is available for any liquid that can flow through a pipeline.

Facilities are also available for blending to your specification . . . for drumming, barreling and canning to meet your needs. You get the privacy, service, safety and flexibility of your own terminals without capital investment.

By maintaining liquid inventories at General American terminals, you can fill rush orders for your customers or meet your own needs quickly, efficiently and economically.

It Pays To Plan With General American

Terminals located at:

Port of New York (Carteret, N. J.)
Port of New Orleans (Good Hope, La.)
Chicago, Illinois (Bedford Park)
Port of Houston (Galena Park and Pasadena, Texas)
Corpus Christi, Texas

GENERAL AMERICAN TANK STORAGE TERMINALS
a division of **GENERAL AMERICAN TRANSPORTATION CORPORATION**
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Up in the Air
about what chemicals to use?
Try Maas phosphates for water treatment—detergent mixtures—cleaning compounds—sequestering agents—dispersants—food processing—stock feed supplements and many other diversified uses.
Maas is the largest producer with the most complete line of phosphates and photo-pure chemicals in the West. No doubt we can help you. Write or call . . .
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VICTOR CHEMICAL

DISTRIBUTION . . . .

Corp. Aerosol and Refrigeration Division has revised its territorial distribution arrangement in the Rocky Mountain area to include Kansas and Nebraska in the setup already serving Arizona, Colorado, New Mexico, Utah and Wyoming.

• Sieberling Rubber Co. (Akron) has appointed Paine & Williams (Cleveland) as sales representatives for rigid Seilon in Ohio and Michigan, and H. B. Strauss Co. (New York) as representatives for Seilon polyvinyl chloride in metropolitan New York, Long Island and New Jersey.

• Pennsylvania Salt Manufacturing Co. (Philadelphia) has selected Cincinnati as headquarters for a new district sales territory for products of its Metal Processing Chemicals Department.

• International Minerals & Chemical Corp. has named the John F. Young Co. (Cincinnati) as sales agent for the feed ingredients department of the Phosphate Chemicals Division in Ohio, Indiana, Michigan and eastern Kentucky and Tennessee.

•

Now On the Market: Synthetic hydrocarbon waxes — high-molecular-weight neutral paraffins, with good temperature resistance and dielectric properties, for use in polishes, cosmetics and in the electrical industry. Trade name: Roxite Hard Waxes. Strohmeyer & Arpe Co. (New York).

• Calcined alumina—ceramic quality. Fired at higher temperatures than metallurgical alumina, the product permits less shrinkage in products fired at lower temperatures. Title: R-2003. Reynolds Metals Co. (Louisville, Ky.).

• Choline salt—2-Hydroxyethyltrimethylammonium bicarbonate, an industrial-grade choline salt finding increased use as an alkaline catalyst for the manufacture of resins and other polymers; also used as an intermediate for making various choline salts. Trade name: Hetab. Commercial Solvents Corp. (New York).

• Acrolein derivative — 1,5-Pentanediol undergoes reactions typical of glycols and forms polyester resins, urethane foams and elastomers and other resinous materials; esters of this diol have been suggested as plasticizers for vinyl polymers and textile fibers such as cotton, rayon and wool. Carbide and Carbon Chemicals Co. (New York).

New Plant: Enna Mercantil

Another new development using

B. F. Goodrich Chemical *raw materials*

B. F. Goodrich Chemical Company does not make these panels. We supply only the raw materials.

Rigid vinyl windows beat double trouble

WHAT do you do when windows are attacked from two sides? By corrosive fumes and hot air inside, and outside by the weather. A chemical plant in Texas had the problem and found the answer. In went new translucent panels made from Geon rigid vinyl—out went the old windows and a costly maintenance problem!

Installing the green-tinted corrugated panels was easy—they were simply nailed in place. Because they are made from Geon, they resist sunlight, cold, rain, acids, alkalis, oil and grease. They are decorative as well as functional.

Products made from Geon rigid vinyl include corrosion-proof pipe, fume ducts, tanks, trays, materials that can be machined, planed, sawed, drilled, and cemented. You'll find other Geon polyvinyl materials in flexible, colorful upholstery, in high-dielectric insulation, in wear-resistant flooring, in hundreds of other successful products.

Geon's remarkable physical and chemical properties may give your products a decisive competitive edge. For technical information, please write Dept. K-10, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

Indoil

Isooctyl Alcohol

INDOIL Isooctyl Alcohol (bp 184-190°C) is a primary alcohol of outstanding esterification quality. Its principal isomeric components are the dimethyl hexanols.

Its esters are finding application as plasticizers for vinyl and other synthetic resins, as hydraulic oils, synthetic lubricating oils, weed and brush killers, etc. Illustrative properties of typical esters follow:

	Sp. Gr. 20/20°C	Pour Point °C	Viscosity Centistokes 20 C	Temp. (°C) for 1000 stokes Viscosity
Mono-esters of:				
Octanoic Acid	0.862	−73	5.0	−73
Pelargonic Acid	0.865	−57	5.4	−73
Capric Acid	0.863	−57	6.9	−73
Lauric Acid	0.863	−32	9.5	−73
2, 4-D Acid	1.153	−40	59	−32
Di-esters of:				
Phthalic Anhydride*	0.981	−48	74	−42
Succinic Acid	0.933	−73	16	−64
Maleic Anhydride	0.940	−65	21	−58
Adipic Acid	0.928	−73	18	−70
Azelaic Acid**	0.917	−73	25	−69
Sebacic Acid**	0.915	−65	27	−68
Diglycollic Acid	0.962	−65	30	−53
Tri-ester:				
Phosphate	0.910	−73	17	−68

* "DIOP" is an outstanding all-purpose vinyl plasticizer, now approved for non-toxic applications as in food wrappings.

** "DIOA" and "DIOS" are applicable in vinyl formulations for low temperature applications.

Contact your supplier for samples of these esters. INDOIL Chemical Company does not manufacture esters, but the outstanding esterification quality of INDOIL Isooctyl Alcohol makes it an unexcelled source for these rapidly growing products.

Send for INDOIL Technical Bulletin No. 22 for further data.

INDOIL

INDOIL CHEMICAL

DISTRIBUTION . . . .

(Mexico City) has just inaugurated a 2,000-square-meter plant in Mexico City for the manufacture of pharmaceuticals and cosmetics using basic materials imported from the U. S. Total investment in the plant now amounts to $100,000.

•

New Trademark—Elvalan will replace Elvadex as Du Pont's trademark for its vinyl acetate copolymer—used principally in textiles as an off-loom finish for dope-dyed acetate yarn and as a sizing for synthetic filaments—to prevent possible conflict between the old one and other trademarks.

•

For Your Reference: Industry, Commerce and Exporter Guide—three-language guide to industry, commerce and exporters of the U. S. A. will shortly be available from El Mundo Paraguayo, South American publishers. The 600-p. volume gives data on U. S. producers, including those in the chemical industry, for South American importers.

• Imagination — report of a study made by a Harvard University graduate school student research group on current methods for stimulating creative thinking. $7.50; Chas. S. Whiting (New York).

• Sorbic acid (food grade)—8. p. bulletin offers technical information on physical properties, solubility in common solvents, inhibition effects on microorganisms, safety, and uses in foods. Carbide and Carbon Chemicals Co. (New York).

• Tooling plastics—folder provides chart describing type, applications, and various compounding calculations. Rezolin, Inc., (Los Angeles).

UNITED COMMUNITY CAMPAIGN

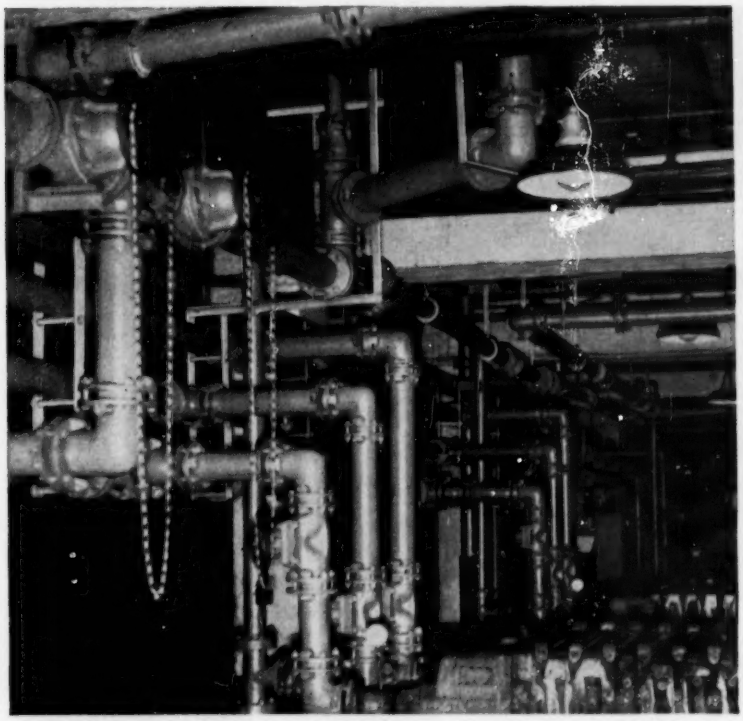
UNITED

WE GIVE

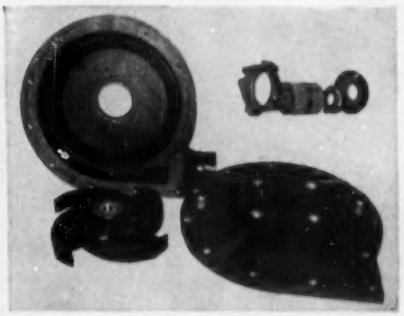
WHERE HAVEG EQUIPMENT IS INSTALLED

TRADE MARK REG. U. S. PAT. OFF.

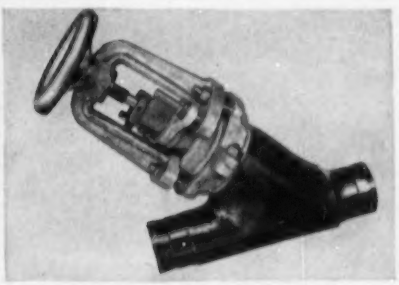
PIPE • DUCT • FITTINGS • VALVES • PUMPS



A typical large installation of Haveg pipe, valves and fittings showing simple method of support required. Haveg pipe is unaffected by thermal shock, seldom requires insulation.



These Haveg parts are used in pumps for hot (104°F.) 30% Hydrochloric acid. Typical record: 33 months without replacing a single part. Many users report even longer life.



Escape potential valve troubles by buying Haveg y-valves and diaphragm valves which are smooth-molded, exactingly machined, tested in the Haveg factory. Haveg works with you on special designs!

Processing Corrosion has been Controlled!

Where liquids get hot and corrosive, it pays to consider all the facts about Haveg piping systems. Haveg has all the major ingredients for good chemical piping. Strength. Durability. Light weight. Outstanding resistance to corrosion and thermal shock.

It withstands rapid temperature changes and enables you to go into a high range of process temperatures with complete safety and a proven history of reliable performance. Haveg piping resists corrosion of practically all acids (except oxidizing acids) and lasts for years without repairs or maintenance.

Haveg *piping* is molded in diameters of ½" up and comes in lengths to 10'. It can be cut and fitted on the job (a new Haveg tool makes this even simpler—ask your Haveg engineer for details). For handling corrosive gases or fumes, Haveg *duct* is made in cylindrical or rectangular shape with lighter walls. Fume hoods, bifurcators, fan housings, fittings, all are made from Haveg and give complete containment and control of corrosives.

It's a long story telling all about Haveg, the moldable, thermosetting plastic material made of acid-digested asbestos and synthetic resins. Haveg is both a material and a service . . . it comes from America's first molders of corrosion-resistant plastic equipment. It can be as big as a 200' stack, as small as a miniature pump part. Call the experienced sales engineer listed. Write for the 64-page illustrated Bulletin F-6 which contains size and chemical resistance charts, design specifications. Remember, Haveg is a logical, proven answer to your design problems in handling hot, corrosive liquids; in fact, in all equipment that must control processing corrosion.

ATLANTA, Exchange 3821 • CLEVELAND 20, Washington 1-8700
DETROIT 39, Kenwood 1-1785 • HOUSTON 4, Jackson 6840
LOS ANGELES 14, Mutual 1105 • SEATTLE 7, Hemlock 1351
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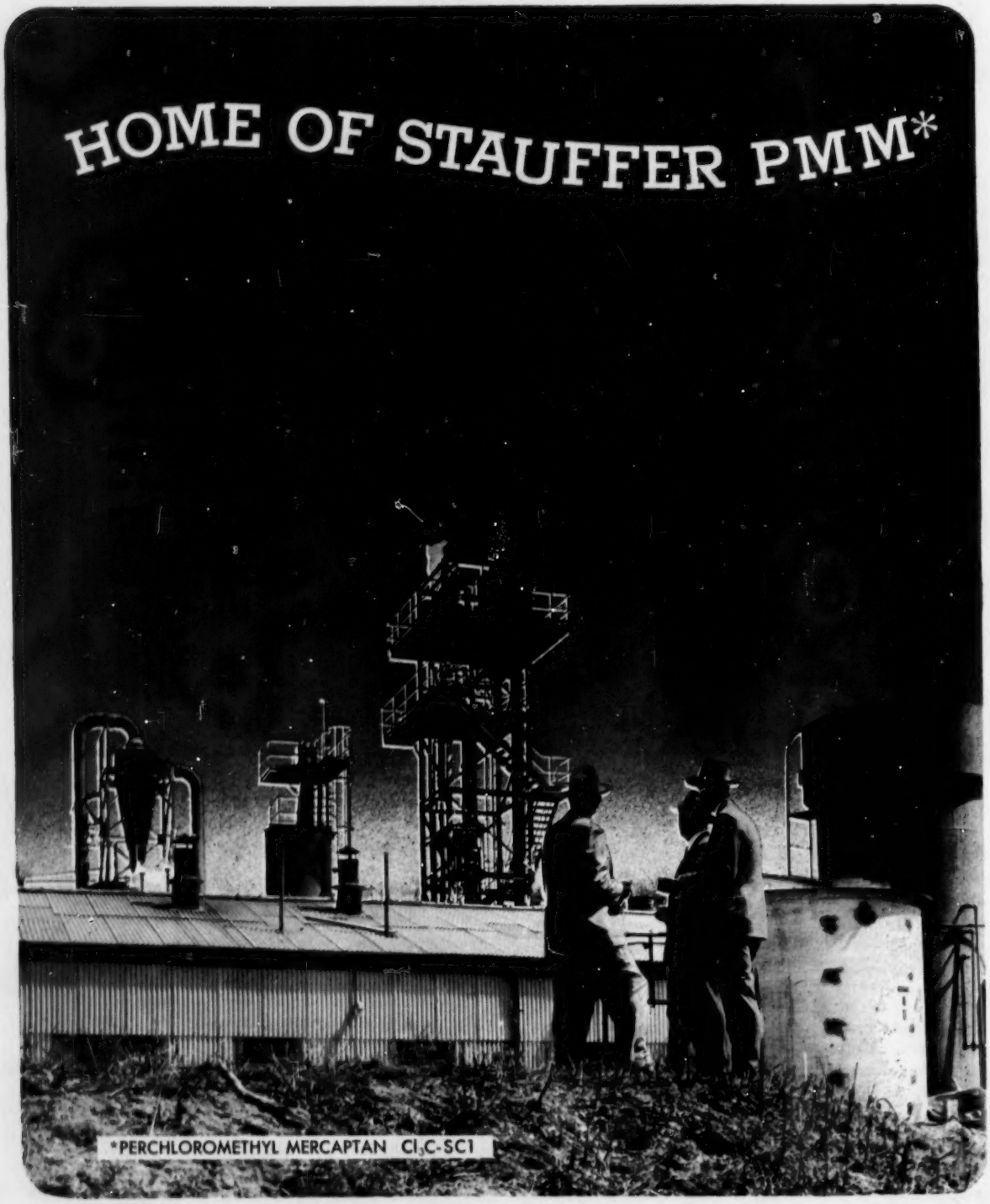
TRADE MARK REG. U. S. PAT. OFF.

900 GREENBANK ROAD • WILMINGTON 8, DELAWARE
FACTORY: MARSHALLTON, DEL. • WYman 8-2276

HOME OF STAUFFER PMM*



*PERCHLOROMETHYL MERCAPTAN $Cl_3C\text{-}SCl$

Stauffer CHEMICALS SINCE 1885

STAUFFER CHEMICALS

THELEN AND MUCHNICK (l. to r.): Their surface studies offer . . .

Better Grip for Adhesives

A spate of new adhesive uses are in the offing as the result of new bonding techniques developed at Philadelphia's Franklin Institute.

The findings are the result of an increased stress on fundamental principles in adhesive research.

One thing missing from future hunts for new adhesives is likely to be traditional emphasis on cut-and-try formulations. That's the opinion of researchers now facing increasingly urgent demands for suitable bonding for such new materials of construction as titanium and magnesium. Bolstering this belief are new findings of basic importance that may, in the long run, accomplish what the empirical approach has been unable to do. As proof of this thesis, metal fabricators this week were pointing to the results of recent work, at Philadelphia's Franklin Institute, on the preparation of metal surfaces for adhesive bonding. Sponsored by the Air Force and carried out by research engineer Samuel Muchnick, the project has developed metal surface treatments that impart to metal bonds a cohesive strength almost equal to that of the bonding agent.

Right now, the work's major potential is in aircraft manufacture, where adhesives are being investigated as a likely solution to the problem of joining hard-to-bond metals such as titanium, magnesium, and aluminum. But, as more fabricating industries turn to adhesives, the importance of such theoretical advances increases.

Using FM-47, a vinyl-phenolic adhesive supplied by Bloomingdale Rubber Co. (Chester, Pa.), Muchnick obtained bond strengths exceeding 7,000 psi. between titanium surfaces; 4,000 psi. for magnesium; 5,500 psi. for aluminum and 7,000 psi. for stainless steel.

Mere degreasing of titanium Muchnick points out, doesn't explain these high values. Trichlorethylene treatment, for example, results in a bond strength of only 3,180 psi. For titanium, he asserts the key is degreasing, followed by a sulfuric acid-sodium dichromate treatment and extensive rinsing.

Similarly, magnesium requires trichlorethylene degreasing; immersion in a solution of sodium metasilicate, tetra sodium pyrophosphate, sodium hydroxide, and Nacconal NR; further rinsing; immersion in 20% chromium trioxide solution, and extensive rinsing.

While the importance of metal-surface treatment is not new (e.g., both acidic and alkaline cleaners are used for aluminum, alkaline cleaners —followed by zinc chromate primer— for magnesium), Muchnick's findings delineate for the first time the surface factors leading to maximum joint strength.

Important Start: Muchnick, in short, has made an important start in putting surface treatments on a sound theoretical footing.

In addition, he has devised a method of determining when the metal surfaces have been adequately treated. It involves measurement of the contact angle of a drop of water on the surface (e.g., bonding success is most likely when the contact angle is very low or zero).

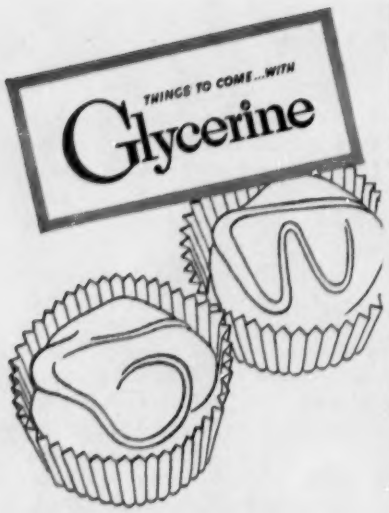
This work emphatically underscores the growing realization that further progress in adhesive development must come from greater knowledge of adhesive theory. Most of the theoretical advances of recent years have sprung directly from rheological (deformation and flow of matter) studies.

Prominent contributors to this area are the institute's Wladimir Philippoff and the University of Wisconsin's John Perry. Their goal: to establish a scientific basis for predicting the properties of any given adhesive. Rheology-minded sponsors of adhesion-studies at Franklin Institute include Du Pont, the Army Chemical Center, American Chicle Co., the National Lime Assn., Hercules Powder and Pittsburgh Plate Glass.

The man who guides the Institute's forward-moving adhesives research is Edmund Thelen, chief of the colloids section. Close to all phases of adhesives research, Thelen offers six factors (*see box, p. 62*) as a blueprint for modern adhesive research.

But the growing stress on theory doesn't mean a hasty exit for empirical formulation studies.

Problems in need of immediate research attention are faster curing adhesives and better control of rheological properties during curing



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Candy makers have a problem when cream fillings develop disagreeable taste and odor after a few weeks on store shelves. They've looked long and hard for a way to eliminate this spoilage which is caused by the formation of free fatty acids. Researchers have tried to stop or slow down the reaction by adding chemical retardants. But taste and texture could not be sacrificed.

Tests have shown that in some cases addition of 1-2% Glycerine almost doubles shelf life, promising a more trouble-free future for the candy industry.

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The New Blueprint for Adhesive Research

The scientific approach to a new adhesive calls for investigation of six areas:

1. **Intrinsic strengths of both adhesives and the metals they are intended to bond.**
2. **Behavior of metals and adhesives under stress.**
3. **Type of surface treatment specifically called for by the material to be bonded.**
4. **Adsorbed films on metals and their role in adhesive effectiveness.**
5. **Viscosity changes of adhesives over a period of time.**
6. **Physical and chemical studies to determine why an adhesive shows affinity to some metals and not others.**

(speed with which the gel forms). And there's always a mark for tailor-mades—adhesives that must be a particular color or must meet requirements of certain production facilities.

Until the new theoretical avenues of adhesive research are explored a lot more thoroughly, getting the right adhesive for a particular application is likely to remain largely a matter of trial and error.

Synthetic Rubber Posers

Late this month an 11-member commission will meet to evaluate the future of the nation's synthetic rubber research program. Set up by National Science Foundation, the group—composed of scientists, businessmen and lawyers—will be facing some knotty problems.

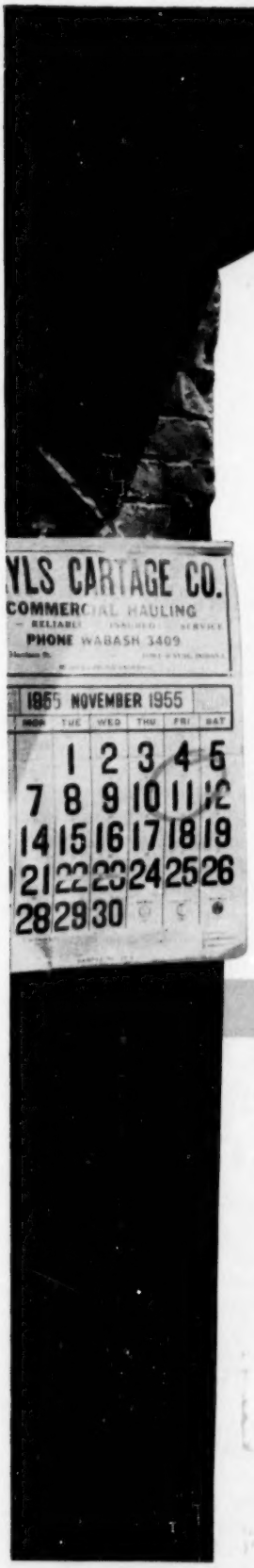
Foremost among these is the issue of national security. Although out of the synthetic rubber business, the government retains a lively interest in synthetic rubber research under the objective of making the country independent of natural rubber.

Right now, synthetics can handle many jobs that formerly were exclusively the property of natural rubber. But there remain a number of applications that only the natural product is able to serve. Case in point: truck tires. Synthetics generate too much heat in regular road operation to be useful as tires.

The government already has invested a small fortune in the effort to develop a good synthetic rubber truck tire. Understandably, it wants guarantees or some degree of control to insure that the work paid for by this investment will continue. Rubber companies, on the other hand, believe that the normal competitive spurs will be sufficient to keep this work going at a fast pace.

The second big problem facing the commission is what to do with the synthetic rubber research laboratory and pilot plant now being operated for the government by the University of Akron. Right now, most experts think it's a moot question whether these facilities (operating on $1 million/year budget) can survive without government subsidy.

The issue would be neatly resolved by reorganizing the research center on a paying basis for sponsored investigations. As a preliminary step in this direction, NSF has asked the university to contract with two companies for pilot projects. After a fee schedule is arrived at, NSF plans an industry-wide survey of potential demand for the laboratory's services.



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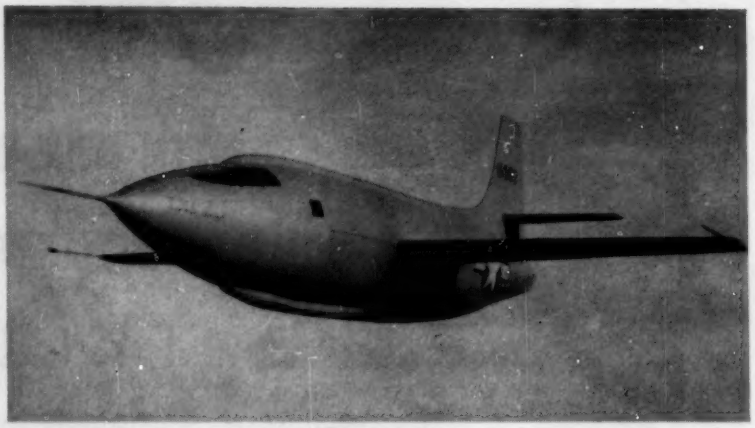

EXPERIMENTAL FIGHTER: In new lubricating jobs . . .

Teflon Takes to the Air

Reverberations of the Korean War are still having an impact in the chemical industry. Case in point: a project, initiated by Naval Research Laboratory during the Korean hostilities, is only now paying off with a covey of new lubricant uses for Teflon.

Developed in cooperation with Du Pont, producer of the fluorinated resin, the fledgling applications are an outgrowth of the Navy's effort to find all-weather lubes for aviation ordnance jobs.

Result of this work is a lubricant coating, reported to be serviceable from —75 F to 500 F. Applied from an aqueous suspension of the resin, the film has met the requirements of a variety of ordnance equipment. A number of civilian uses also appear possible, although cost here is likely to be a major handicap.

NRL researchers settled on Teflon after evaluating 14 dry film lubricants against these requirements: good adhesion to brass and steel over the temperature range —75 F to 500 F; no softening or melting point over 500 F; repellent to both water and dirt; negligible solubility in oils and solvents; ease of application; ability to protect brass and steel from atmospheric corrosion; and abundance in the event of war.

The first practical test for Teflon was as a cartridge-case coating. A large quantity of Teflon-coated ammunition was produced for the Bureau of Ordnance by a private contractor; reportedly reduced cartridge jamming, kept guns cleaner and performed better than ordinary lubricants over the operating temperature range.

Success of these trials paved the way for studies of Teflon in other military and some civilian lubricating problems. The Marine Corps recently completed an eight-month series of field tests of pistols, rifles, ammunition and other ordnance equipment utilizing Teflon lubricants. Results are said to be satisfactory.

Potential civilian applications are concerned with the dry lubrication of bearings, gears, screws, valves and a range of hydraulic and pneumatic equipment. Many high-quality household items—spigots, door hinges, record players, etc.—might also make use of the plastic lubricant.

Cost is the biggest drawback to all nonmilitary uses. Where industrial applications are concerned, Teflon must point for spots in which the economies of lifetime lubrication would offset the initial heavy expense. How many such opportunities exist is very much a moot question.

In an aqueous suspension suitable for coating uses, Teflon sells for about $75/gal.—a figure that might be reduced if a big-volume outlet shaped up. Right now, chemical- and heat-resistant Teflon coatings are seeing some commercial service as antistick surfaces in baking, printing and packaging. Teflon-coated glass fabrics, moreover, are used as conveyor belts in the food industry and as linings of textile drying drums.

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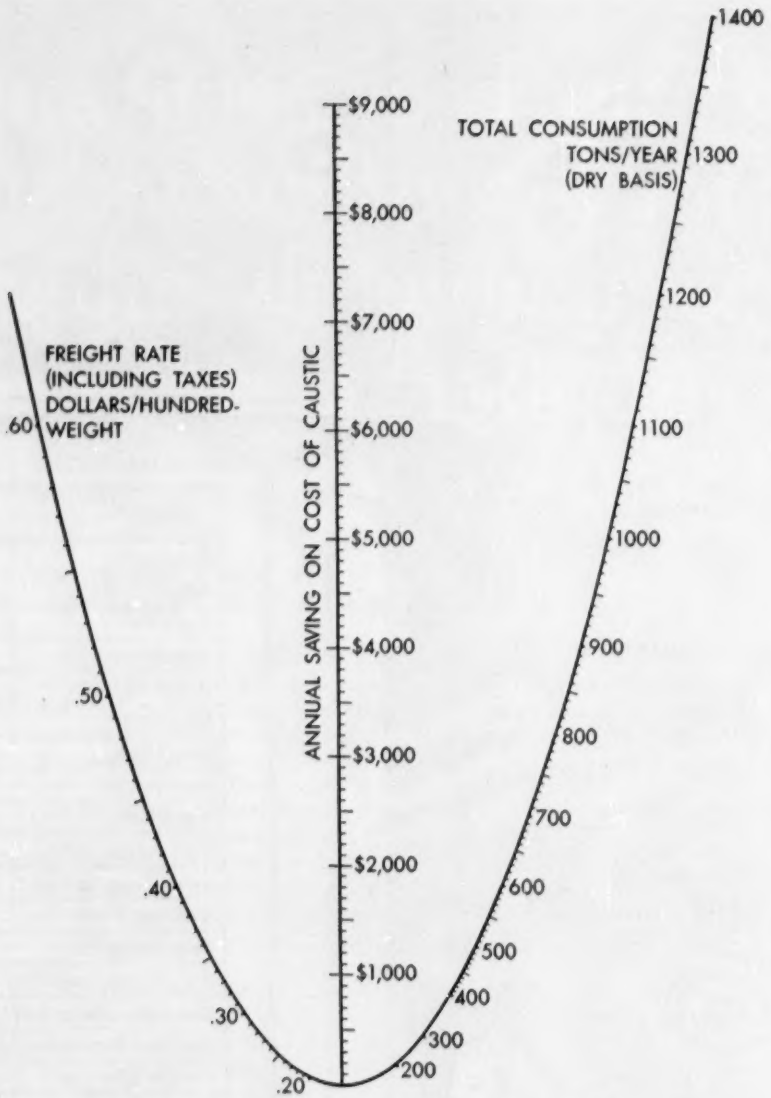

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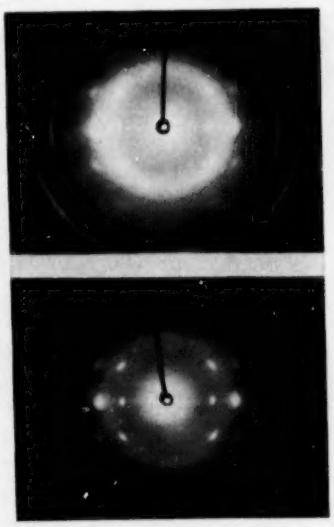
Custom Coat: With very few exceptions, Teflon coatings are applied on a custom basis by firms specializing in the tricky process.

The method, developed at NRL, points up the problems involved:

The object to be coated is sandblasted, heated to 700 F, cooled, and sprayed with the Teflon suspension to an average thickness of .2-.3 mils. (Multiple coats may be sprayed on.) After an air-drying, the coating is baked at about 700 F for an indefinite period of time based, in part, on film thickness.

The Navy's Bureaus of Ordnance and Ships are now operating experimental Teflon coating facilities, and a number of private custom applicators are flourishing. But it's doubtful whether Teflon coating will ever become a do-it-yourself proposition.



See the Difference?

THESE X-ray diffraction patterns point up the success of Firestone researchers in producing a synthetic copy of natural rubber (*see p. 62*). The upper pattern is natural rubber; the lower is a new synthetic developed by company chemists (*CW, Sept. 3, p. 84*). Most synthetics yield X-ray patterns that are simple halos without the bright spots (representing areas of crystallinity) seen above. The difference between Firestone's "synthetic natural" and a "synthetic natural" unveiled late last year by Goodrich-Gulf is not yet known.

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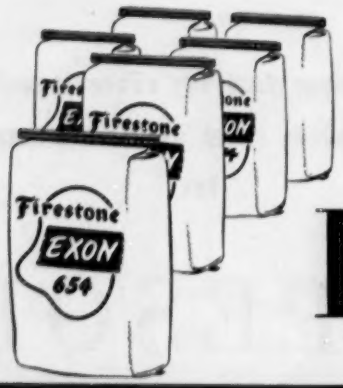

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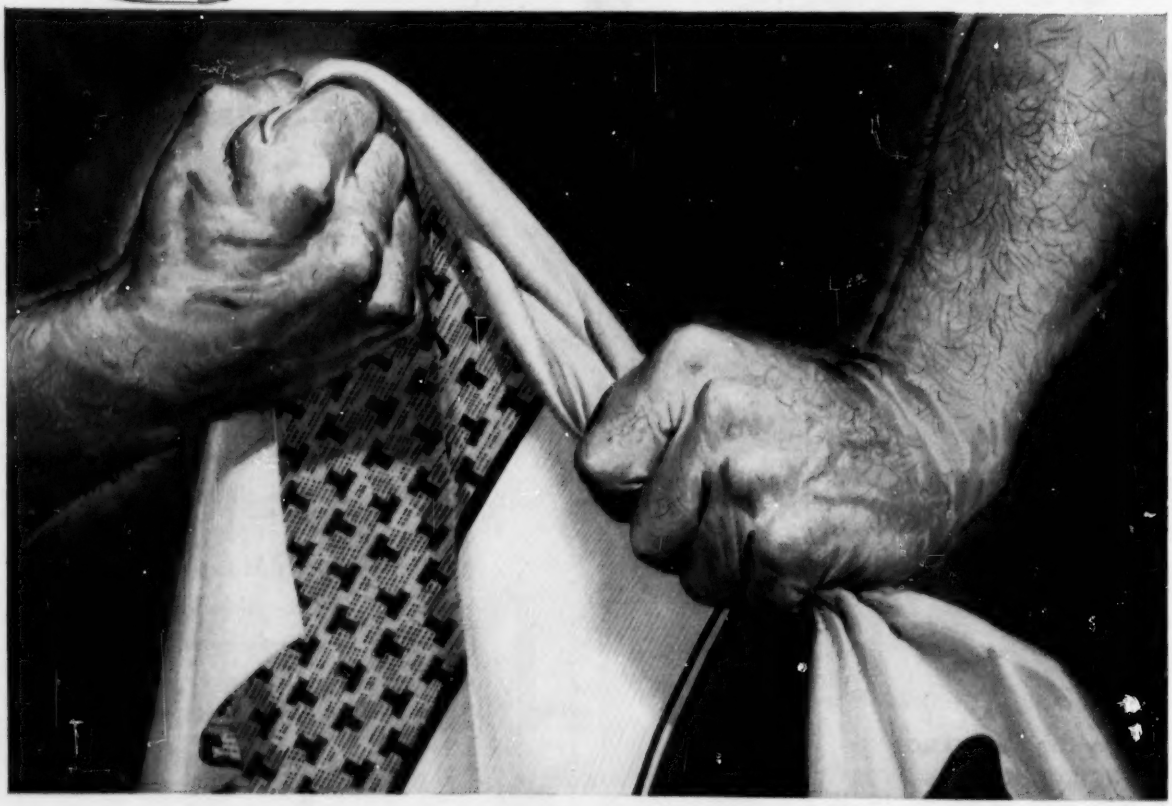

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Healthy Crop

The rate at which new products are spawned is one of the best indications of the chemical industry's vigor. That's why CW's 1955 "New Chemicals for Industry" report is good news. Featured in the Buyer's Guide section of this week's issue, the annual survey lists 426 chemicals and specialties introduced during the past year.

By any standard, this is a healthy showing.

The bumper crop contains the tangible results of pioneering research in these areas.

• Isocyanates: Several entries reflect the effort to capitalize on isocyanates' potential in plastics, adhesives, elastomers, etc. (*CW, July 17, '54, p. 66*). Carwin's naphthyl isocyanate, bearing the family name, is obvious in this connection. Not so are General Aniline's mixed tolylene diamines and Monsanto's alkylanilines C-5, C-12—all isocyanate precursors. Rohm & Haas' Paraplex U-148 polyester resin is bidding for jobs on its ability to produce flexible foams by reacting (in water) with diisocyanates.

• Olefin oxides: Possessing a variety of possible uses are compounds of this group available from Dow (*CW, Nov. 7, '53, p. 34*), Carbide, and Millmaster. Dow's straight-chain butylene oxides have surface-active properties, are intermediates for polyglycols and Dowanol-type materials (glycol ethers). Carbide's butadiene oxide, diisobutylene oxide, styrene oxide and vinylcyclohexene dioxide (all available in research quantities) are seeking employment as monomers, epoxy resin diluent, chlorinated rubber stabilizers, and intermediates for insecticides, drugs, surface-active agents, lube-oil additives. Generally the same is true of Millmaster's benzylethylene oxide.

• Acetylene derivatives: Included are high-pressure specimens like 1,2,4-butanetriol and propargyl chloride, products of General Aniline's Grasselli, N.J., pilot plant (*CW, May 30, '53, p. 38*). Also noteworthy is American Cyanamid's polymethylstyrene molding

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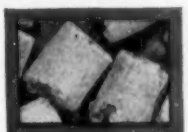

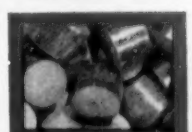

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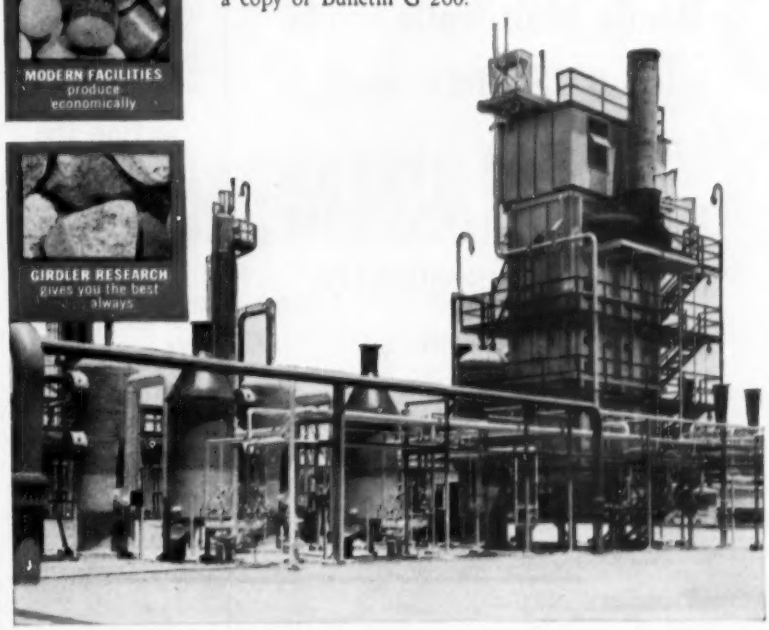

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compound and methylstyrene-acrylonitrile copolymer molding compound, both based on acetylene-derived methylstyrene (*CW, Oct. 24, '53, p. 41*).

• Coal hydrogenation: New Carbide coal hydro chemicals include fluoranthene and pyrene—polycyclic hydrocarbons available in development quantities for the synthesis of dyes and other products.

• Fermentation products: Pfizer's itaconic acid (*CW, Apr. 2, p. 48*) and kojic (*CW, June 11, p. 102*) acid are intermediates; Citroflex A-4 (acetyltributyl citrate) and A-8 (acetyltri-2-ethylhexyl citrate) are new plasticizers derived from citric acid.

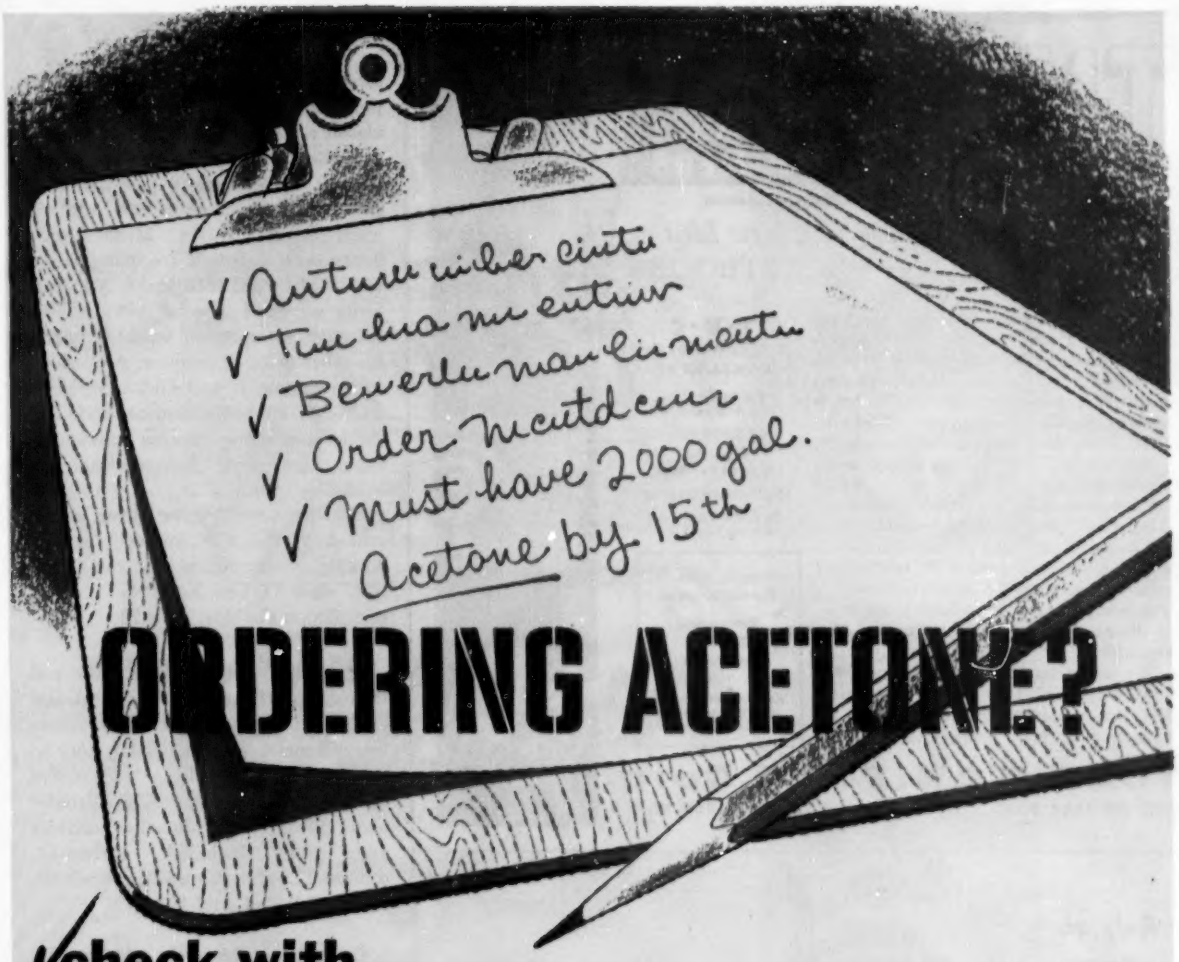
Other Signs of Activity: The remaining entries show indelible signs of activity in fluorochemicals, amino acids, phosphorus chemistry, silicones and tin compounds.

• L-lysine, DL-serine and DL-valine from Du Pont, Dow and Monsanto, respectively, represent the amino acids. Produced in limited semicommercial quantities by Du Pont's electrochemicals department, L-lysine (*CW, Dec. 11, '54, p. 10*) is finding increasing use as a nutritional supplement in bread, cereal and other wheat foods. Serine, too, is available for commercial use in human and livestock nutrition, while valine is still strictly a research chemical.

• The flock of phosphorus compounds for synthesis and specialty applications emanates from such familiar quarters as Victor Chemical (chloromethane phosphonic acid, etc.), Virginia-Carolina (2-ethylhexyloctylphenyl phosphite, etc.) and Monsanto (trimethyl phosphite).

• New silicones reflect the impact of military demands. Dow Corning 6 Compound, 220 Fluid and 301 Molding Compound — for use in bombs, rockets, artillery shells and underwater electronic devices — are cases in point. Silicone gums, emulsions and foaming powders, making their debut, have more of a civilian stamp.

• The silicones, moreover, are responsible for a series of new tin chemicals from Metal & Thermit. Polymerization of silicones for water repellents is the specialty of stannous 2-ethylhexoate, stannous oleate, stannous naphthenate and Silicone Catalyst SC1515. Other tin derivatives included: stannous caproate, stannous



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RESEARCH . . . . . .

stearate, stannous fluoride. Aside from polymerization catalyst, the tin family claims a host of potential uses.

Sulfonate Abundance: A striking feature of this year's new-chemicals collection is the abundance of sulfonic acids and derivatives. More than a dozen such materials are included (of which Du Pont lists nine). The majority are miscellaneous intermediates, although some reveal valuable talents for other tasks. Examples: Arapahoe's Dibromamine B and Dichloramine B (N,N-dibromobenzenesulfonamide and the corresponding chlorine derivative), which are novel halogenating and oxidizing agents.

Of the several-score firms represented in the *CW* survey, General Aniline stands out as the most prolific, with 35 new products. Runner up: Union Carbide, with 28.

•

Hot Lab: A big lift to the National Bureau of Standards radiochemical program is expected from the recent establishment of its new laboratory to prepare and distribute radioactive materials. Currently, the lab handles about 57 different radioactive nuclides and ores. Included: carbon-14, sodium-22, phosphorus-32, cobalt-60, iodine-131, and gold-198.

•

Operations Research: Arthur D. Little, Inc. (Cambridge, Mass.) now maintains an operations research staff in San Francisco, reveals a strong demand by Western firms for its analytical and experimental approach in solving business problems. The new staff is headed by Frank Hulswit.

•

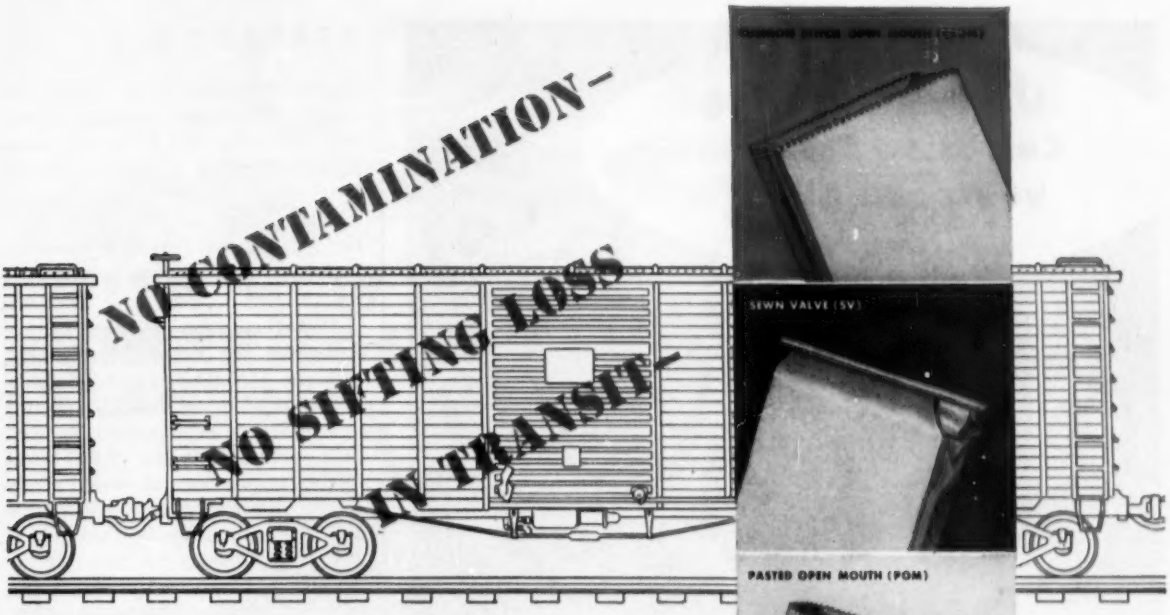
Better Column: For greater laboratory convenience, Glass Engineering Laboratories (Belmont, Calif.) has redesigned its vacuum-distillation column introduced last year. New features: rapid access to all parts requiring removal or adjustment during operation.

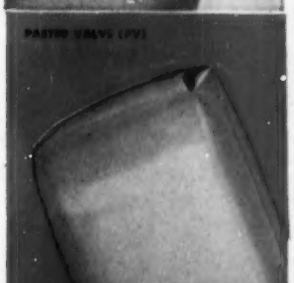
•

Soil Sterilant: New work at the Southern Forest Experiment Station, Forest Service, U. S. Dept. of Agriculture, has reportedly turned up valuable soil sterilant and phytotoxic properties in 3-(p-chlorophenyl)-1,1-dimethylurea. The compound is characterized by low flammability and low toxicity.

•

Growth Controllers: Investigations





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Ordinary valve worries of leaking packing, clogged bonnets and corroded working parts are eliminated by the unique design of the Hills-McCanna Saunders Patent diaphragm valve. A tough, resilient diaphragm completely *isolates* the bonnet and its working parts from the valve body. The *cushion* closure is drip tight. Surface irregularities or scale are no cause of leakage because the diaphragm *accommodates* itself to them . . . like a tire to small stones. Packing worries are *easily* forgotten, too—no packing is needed because no fluid can enter the bonnet.

Available with choice of 15 diaphragm materials, body materials of *any* machinable alloy and a choice of linings, Hills-McCanna valves range in sizes from ⅜" through 14". May be used at pressures to 150 psi, temperatures to 350° F. Choice of remote, handwheel or lever operators.

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RESEARCH.....

of dithiocarbamates at the Institute for Organic Chemistry, Utrecht University, Holland, reveal distinct plant growth-regulating activity by S-(carboxymethyl) dimethyldithiocarbamate. The compound was prepared by reaction of sodium dimethyldithiocarbamate with monochloroacetic acid.

•

High-Temperature Rubbers: Just released by the Office of Technical Services, U.S. Department of Commerce (Washington 25, D.C.), are two new reports on high-temperature work with synthetic rubbers. PB 111693 ($3.50) covers research toward a rubber to withstand ester-type lubricants at 350 F and hydraulic fluids up to 550 F. Promising results were reportedly obtained with two acrylate polymers and one experimental rubber.

PB 111641 ($1.50) describes research into the effects of high-temperature emulsion polymerization on oil resistance and low-temperature properties of butadiene elastomers. Improvement in oil and heat resistance, some reduction in tensile properties (at 120 C) were observed in butadiene-acrylonitrile elastomers and copolymers prepared at 50, 90, and 120 C.

•

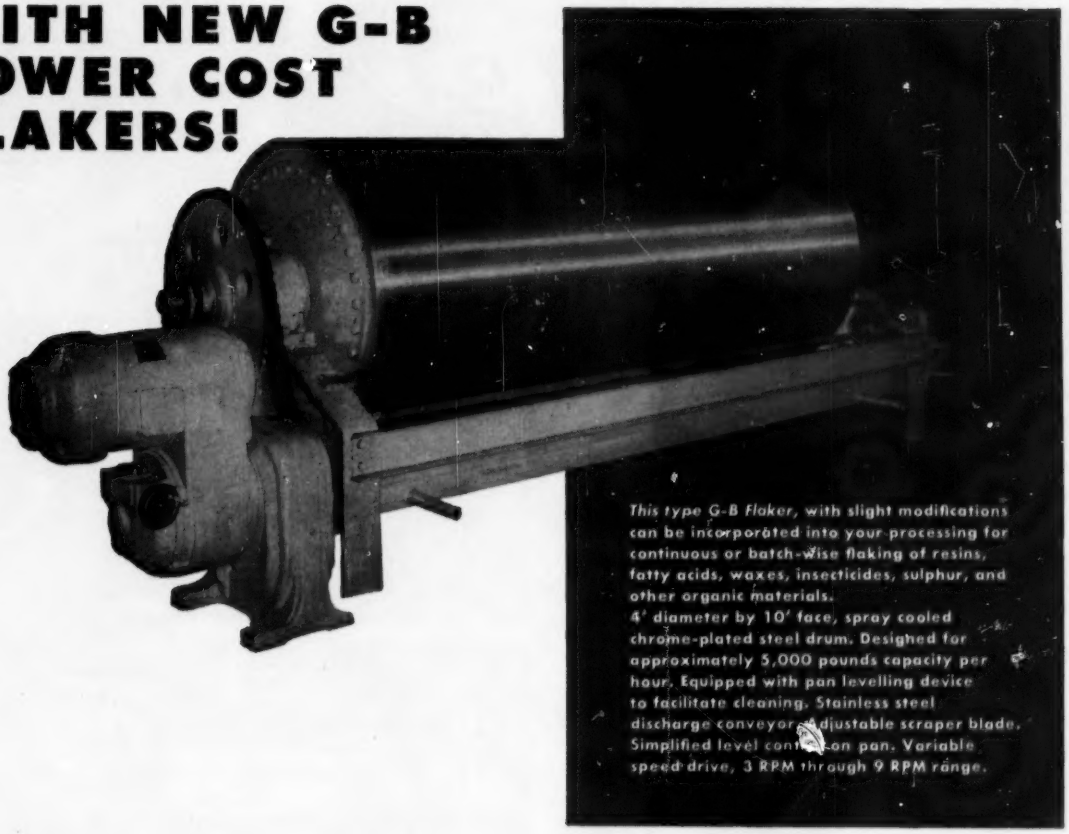
New Extractor: A combination of adsorption and dialysis underlies a new extraction technique developed by researchers of Western Utilization Research Branch (Albany, Calif.) of U.S. Dept. of Agriculture. Here's how it works: slurries of an adsorbent and the mixture are separated by a semipermeable membrane and agitated. Amino acids and other low molecular-weight materials diffuse through the membrane. When a cation-exchange resin is used as an adsorbent, compounds containing basic groups (e.g., amino acids) are selectively removed from solution, while non-basic compounds are rejected.

•

For What? Wondering why they developed it, Riegel Paper Corp. (New York) researchers have a new paper said to be extremely resistant to passage of oil, water, and other liquids, but lets air through freely. The company is open for suggestions on possible uses. Suggested so far: paper raincoats that shed water, but keep wearers cool; popcorn bags that won't leak grease, but can't be popped in theatres.

GET DOWN LOW

WITH NEW G-B LOWER COST FLAKERS!



This type G-B Flaker, with slight modifications can be incorporated into your processing for continuous or batch-wise flaking of resins, fatty acids, waxes, insecticides, sulphur, and other organic materials.
4' diameter by 10' face, spray cooled chrome-plated steel drum. Designed for approximately 5,000 pounds capacity per hour. Equipped with pan levelling device to facilitate cleaning. Stainless steel discharge conveyor and adjustable scraper blade. Simplified level control on pan. Variable speed drive, 3 RPM through 9 RPM range.

We can point to many instances where new, low *first cost* G-B designs have resulted in lower overall product flaking costs, too. This double-barrelled economy in flaker equipment design deserves *your careful re-examination* of your flaking costs as a means of product conversion. Phthalic anhydride, sulphur, benzene hexachloride, caustic, and resins of all types can be efficiently and economically processed by G-B flakers.

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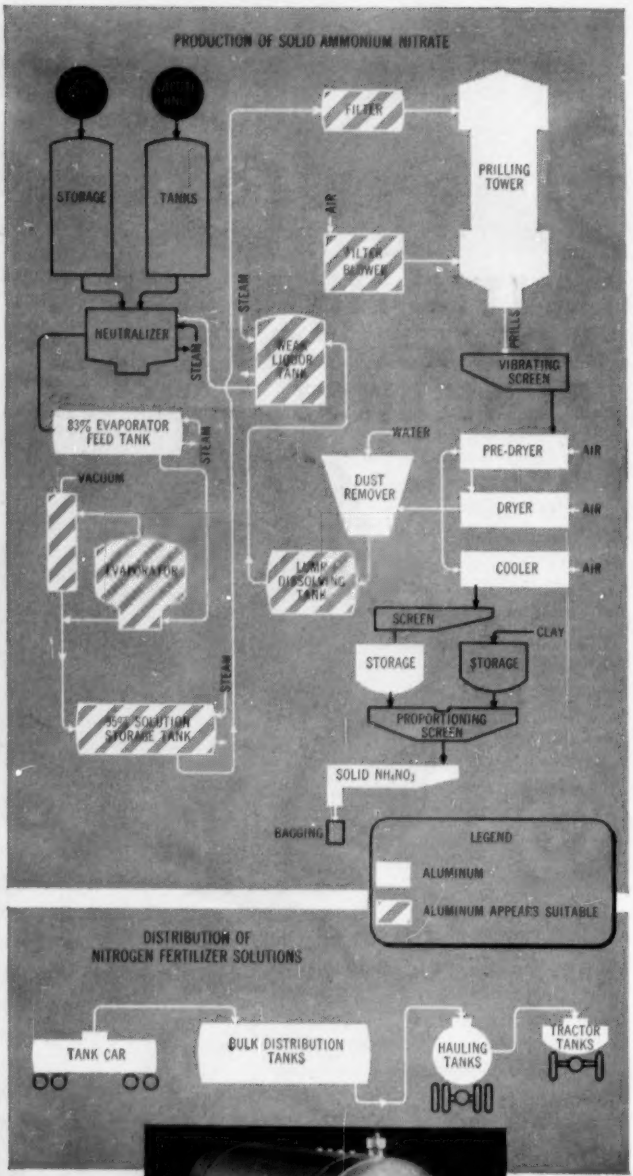
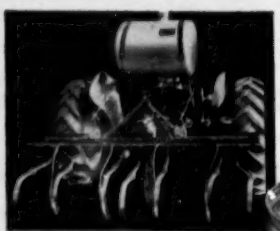
Almost from the time its ingredient, natural gas, is first taken from the earth until it is finally returned as fertilizer, AMMONIUM NITRATE and its solutions are handled extensively in ALCOA Aluminum.

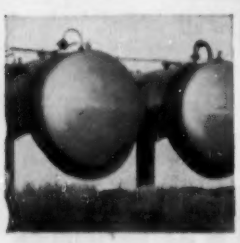
For example, ammonia tanks, nitrogen chilling exchangers, prilling towers, tank cars, piping, drums and solution storage tanks of ALCOA Aluminum have been in service for years. Aluminum does not render the nitrate unstable. Moreover, ALCOA Aluminum for floor grating, structural members, housings, roofing, siding, smokestacks, sash, doors, trim, drainage trench lining, electrical fittings and devices, instrument lines and electrical conduit is giving excellent service in ammonium nitrate plants.

AMMONIUM NITRATE, AMMONIATED, does not attack aluminum. Aluminum pressure vessels, storage tanks, piping and tank cars are excellent for handling these nitrogen fertilizer solutions.



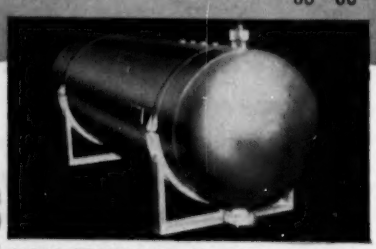


ALCOA NITROGEN FERTILIZER STORAGE TANKS are designed for pressure or nonpressure service. Capacities range from 5,000 to 22,000 gallons.



ALCOA APPLICATOR TANKS have standard capacities of 55, 75, 100 and 200 gallons.

INJECTION TANKS. Alcoa's standard 55 gallon general purpose drum is readily adaptable as a fertilizer injection tank on the suction side of irrigation systems.



ALCOA TRANSPORT OR FARM STORAGE TANKS, in 550 or 1,000 gallon capacities, are easily mounted on wagon. No floor required.

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CIL'S INSTRUMENTATION WORKSHOP: Self-sufficient, it forecasts the push-button plant's need for a . . .

Clinic to Treat Ailing Automation

It used to be that a man was considered an accomplished chemical engineer merely if he had a thorough knowledge of chemistry, a flair for mathematics, an instinct for mechanics and was an able carpenter, electrician and plumber. Now, in addition to all that, he's got to be an instrument engineer, too.

Take, for instance, the brand-new instrument workshop toured this week by the CW CAMERA. It was built by Canadian Industries (1954) Ltd. to service its Terylene polyester plant. But for other members of the process industries, it may simply be a preview of the problems raised by the trend toward more automatic production.

At first glance, the most striking thing about the shop is its size. Completely air-conditioned and brightly lighted, its two rooms occupy a 38x53-ft. area. And the array of special tools, convenient testing equipment and spacious workbenches are a far cry from the makeshift equipment that serves for instrument repair in a cluttered corner of many a maintenance shop.

Some of the special testing apparatus was designed and built by CIL's Gordon Hall. As chief instrument and electrical engineer, Hall is directly responsible for diagnosing and prescribing for the plant's ailing instruments. His goal: to accommodate "virtually everything that comes along."

And in the Terylene plant, "virtually everything" covers a lot of ground. For despite its 450 (and eventually 800) employees, the plant is, to a very considerable extent, push-button-operated.

In both the manufacture of the polymer and in the spinning of the synthetic fiber, automatic controls are required to maintain exacting temperatures and pressures. In the polymer plant, for example, temperature of the molten polymer must be controlled to within a half of a degree. And in the spinning building, the delivery rate through spinnerets and windup speeds are held to less than 1% to ensure uniformity of the fiber.

Further on, at the drawtwisters, automatic controls closely monitor the temperature at 112 positions on each drawtwist machine. Master-minding the operation, scanning indicators check up on components, flash a warning signal when any of the vital conditions fall outside the range of desired accuracy.

Handled With Care: When one of the devices breaks down, it's carted to Hall's instrument clinic for speedy overhaul. And from the time it leaves the line until it's returned to service, each instrument is transported on a special buggy, handled as delicately as a hospital patient going to surgery.

Once inside the workshop, the instruments are carefully examined in the test section. A large 12x6-ft. pressure testing panel, designed by Hall, affords a rapid check on either vac-

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Skilled professional personnel, with their wide experience in producing some 3500 Eastman Organic Chemicals, will be glad to help you. And our great variety of equipment for all types of organic reactions is at your service for bulk production.

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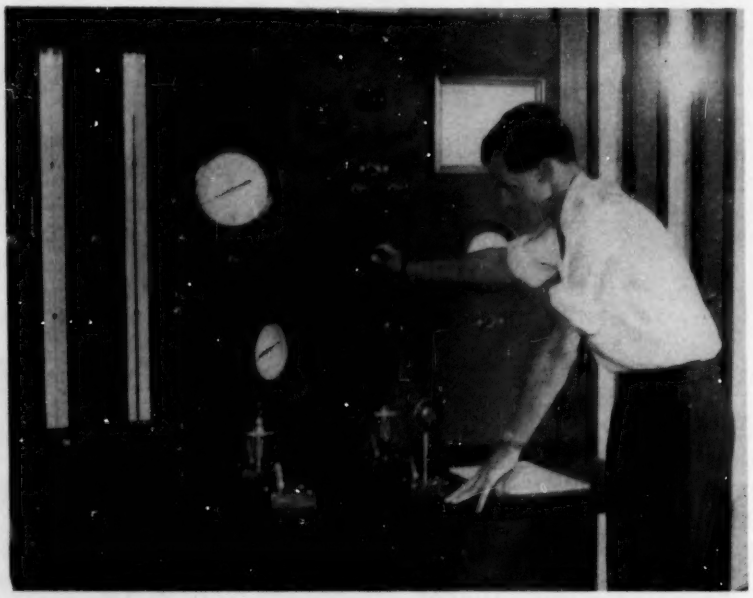
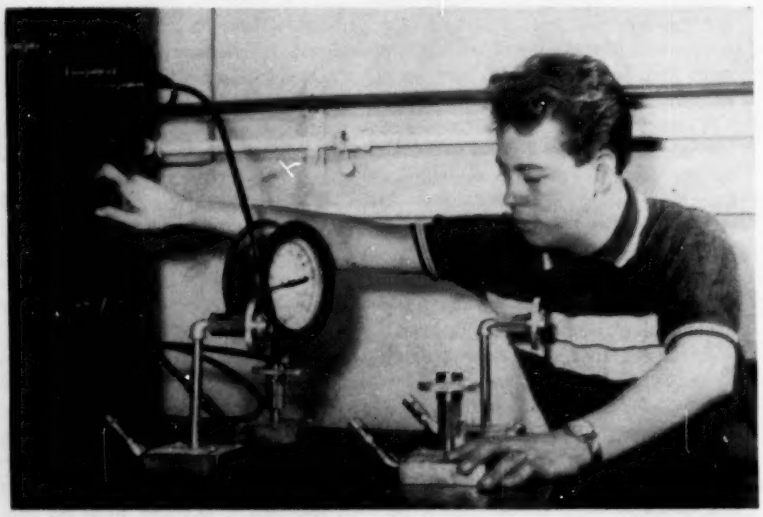


INSTRUMENTEER HALL: His test panel speeds calibration with . . .

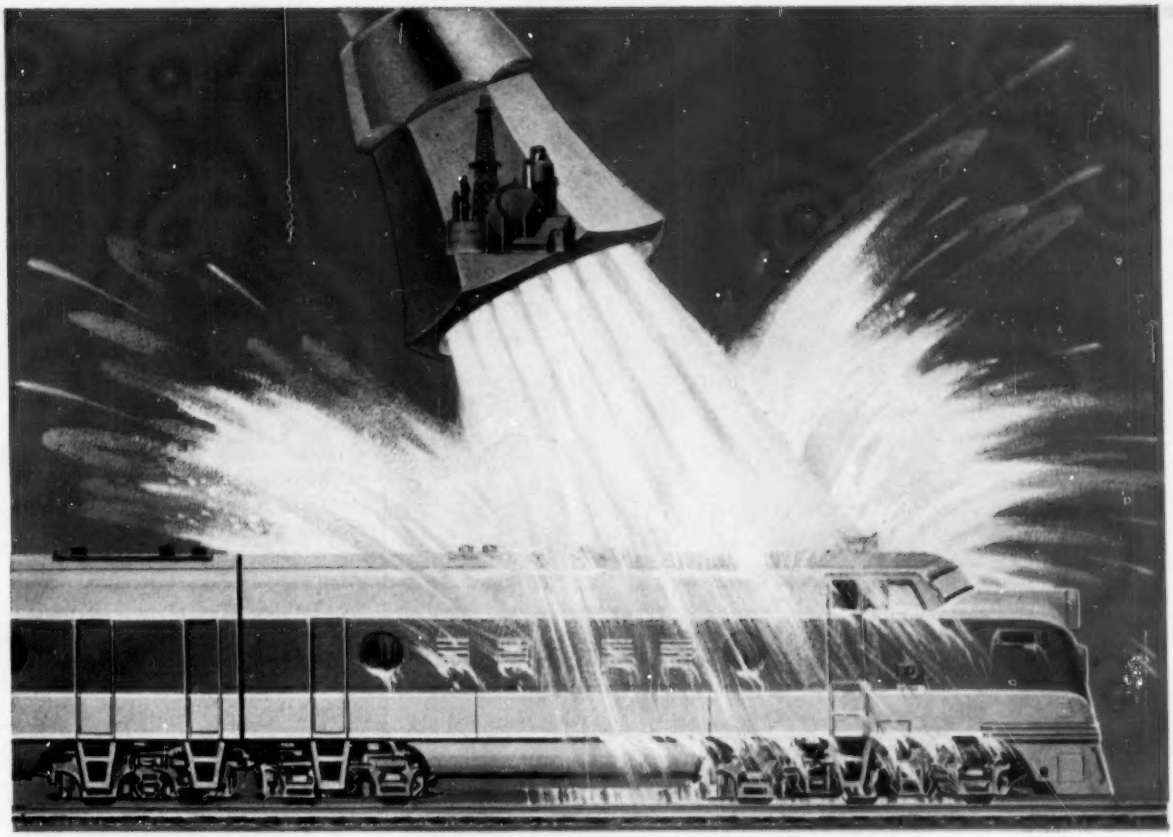
uum or pressure calibration of any instrument in use throughout the plant. Incorporating a variety of gauges, mercury and water-tube manometers, and a deadweight tester measuring up to 1,000 psi., the panel is equipped with flexible tubing and quick-coupling devices to facilitate fast setting up.

Additional equipment in the test section includes such items as a cathode-ray oscilloscope, vacuum-tube volt meters, volt-ohm-milliammeters, vacuum-tube tester and a signal generator for checking out electrical circuits. There is also a Wheatstone bridge for precision testing resistance thermometers and portable potentiometers for testing thermocouples.

If repairs are indicated, the instruments can be practically rebuilt in the well-outfitted repair department of the workshop. There, conventional drilling and grinding machines are supplemented with special tools, such as a super-high-speed (21,350 rpm.) drilling machine, a high-precision lathe for machining small gauge parts,



. . . time-saving plug-in gauges that set up in a hurry.



FOR THAT CLEAN-AS-A-WHISTLE LOOK

Giving a train a shower and shine is an everyday affair for railroads. The trick is to do the job with minimum effort and get the train back to work promptly.

That's where the Atlantic Ultrawets come in . . . the Ultrawets provide outstanding cleansing properties. Gritty, greasy particles of dirt rinse off easily, leave a streak-free finish that dries shining-clean.

These superior synthetic detergents are one of a group of Atlantic petrochemicals (so you see a miniature oil refinery in the picture).

Naturally, these unusually able Ultrawets are also used in formulations for many other operations: from shampoos for milady to wetting agents in textile mills.

The Ultrawets are one part of Atlantic's ever-growing family of petrochemicals, for which industry is constantly finding new and profitable uses . . . in new products . . . in cost-saving manufacturing advantages . . . in adding new sales-pluses to well-established products. Atlantic sales engineers are always ready to help your staff get the most from your use of Atlantic petroche. .cals.

For full information on Atlantic petrochemicals and services, write to The Atlantic Refining Co., Dept. H-92, 260 South Broad St., Philadelphia 1, Pa.

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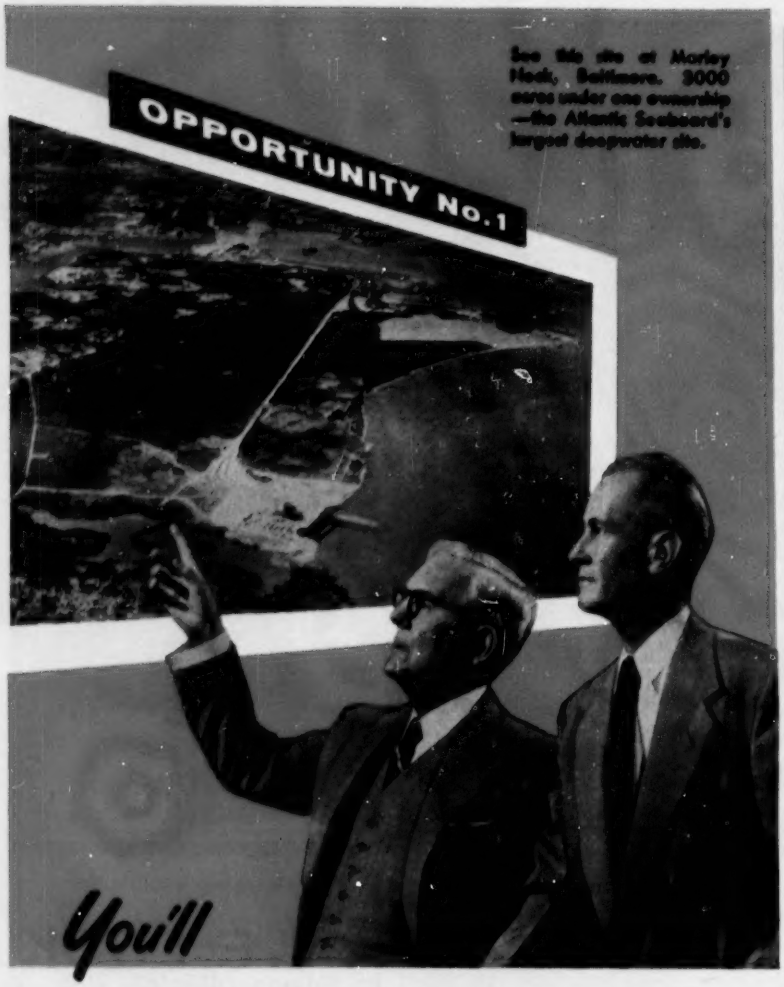
ATLANTIC PETROLEUM CHEMICALS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PRODUCTION . . . . .

temperature calibrating baths for both general application and for high-precision resistance thermometers. There's even an engraving machine to turn out the numerous labels required for controls throughout the plant.

Self-sufficiency: It's because of the Terylene plant's heavy dependence upon such instrumentation that a generous-sized and fully equipped instrument workshop became imperative. CIL's remoteness from major repair centers underlined the need.

The move foreshadows an almost inevitable trend in the push-button plant of tomorrow. And with such recognition for the vital role of instrumentation, says Hall, it looks as though the instrument engineer is finally coming into his own.

Picking Up the Pieces

The rains came and went, but the cleanup operations after the worst flood in the history of the Northeast will be going on for many months:

- And to help the process industry recover, Westinghouse put its Bridgeport, Conn., plant on an emergency basis. Hundreds of motors are being rehabilitated daily at the plant; equipment that's too heavy to be moved is being serviced at the sites.
- Repair and cleanup at U.S. Rubber's Naugatuck plant, one of the worst hit in the area, is progressing "quickly and satisfactorily," according to George Vila, assistant general manager of the Naugatuck Division. Within a week after the storm, the power plant had been put back into operation, and partial chemical production was scheduled to start up again by last week. Main damage was to reclaimed rubber production facilities, office buildings and some pilot plants. Principal production facilities for rubber chemicals, ag chemicals and plastics got off relatively unscathed.
- A survey just completed by the Copper & Brass Research Assn. of its members' plants hit by the flood revealed that production in some cases might be restored sooner than had been anticipated. Nine members in Connecticut were affected by the flood; four are not yet able to give an estimate as to when they'll be back into full production. Estimates of the other five on production target dates ranged from "next week" to November 1.

How "Dutch Boy" Chemicals help give

the electrical industry

more reliable vinyl plastic insulations

Unprotected vinyl compounds lose desired properties fast when heats go into the 300-400°F. range. Yet in producing vinyl insulations, process heats go this high.

High temperature appliance grades, in addition, must stand prolonged use at 194° to 221°F.

National Lead research has come up with five exceptional heat stabilizers that substantially increase reliability of vinyl electrical compounds.

"Dutch Boy" Tribase, Tribase E, and new Lectro "60" stabilizers maintain valuable physical and electrical properties in standard insulations. Ordinarily Tribase imparts highest reliability . . . Lectro "60", superior water repellency and lowest volume cost.

"Dutch Boy" Dythal* is the best available commercial stabilizer to use in high temperature appliance wire insulations. It's good for bright colors, too.

Small amounts of "Dutch Boy" Stabilizer DS-207* help Tribase, Tribase E, Lectro "60", and Dythal do an even better job.

A recently developed National Lead vinyl plasticizer, "Dutch Boy" NL A-54, steps up electrical properties and reduces cost in vinyl insulations.

Versatile "Dutch Boy" Chemicals have proven equally useful in the drug industry, the paint, the cosmetic, the ink and many another industry.

You may want to explore the use of "Dutch Boy" Chemicals . . . the stabilizers mentioned above and others . . . new "Dutch Boy" double-duty primary Plasticizers . . . unique new "Dutch Boy" Gelling Agents for organic and aqueous systems. If so, simply fill in and mail the coupon.

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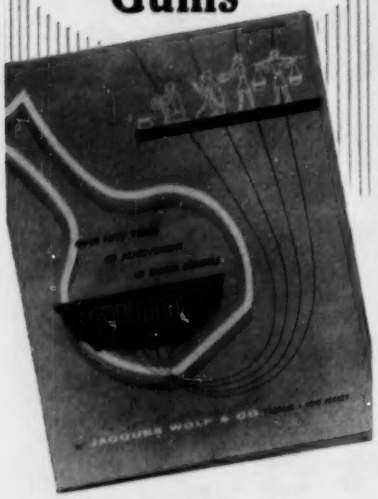
FASCINATING BOOKLET

"The Story of Water Soluble Gums"



From strange and exotic countries come the natural gums which are in greatest demand in modern America. Gum Arabic, Tragacanth, Karaya, Irish Moss, and Locust Bean... some transported half way around the world to you by Jacques Wolf & Company, direct importers of gums for over 50 years.

The fascinating story of the history, characteristics, and uses of these famous gums is presented in the booklet "The Story of Water Soluble Gums". Jacques Wolf & Company is happy to again offer this booklet as a service to all users of chemicals without obligation.

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ANYON, JONES: They have the answers to the $3 billion question . . .

How to Buy Equipment

"In at least one respect, the purchase of capital equipment is like choosing a wife: Make a bad selection, and you may spend the rest of your life regretting it."

So conclude Wharton School's G. Jay Anyon and Du Pont's Harold Jones in the *Chemical Week Buyer's Guide*, out this week (*CW, Sept. 17, Part 2*). This is how they reason:

The chemical process industry this year will spend some $3.03 million modernizing and expanding its capital facilities. It behooves the man who is charged with the responsibility for spending that money to shop wisely.

Common Denominators: In the large sense, of course, the problems created by the purchase of capital equipment are ones for which there are no pat answers. What Anyon and Jones do is to break the big problem down into eight smaller problems, common to any operation involving the purchase of capital equipment. Then, in an orderly, logical manner, they deal with each of the smaller problems, give some pertinent advice on things to do and things not to do. These are some of the points they make:

• Specification. Writing the specification is usually the first order of business after the decision to buy has been made. It can be done a lot more efficiently, suggest Anyon and Jones, if the writer remembers that the definition is merely the technical definition of the need in terms that the supplier can understand. They deal with "performance" specifications and "equipment" specifications, give some helpful hints on when you should use which.

• Bidders List. The size of the bidders list will be dictated by the complexity of the equipment being sought. The authors point out some of the factors that you should take into consideration when putting the list together.

• Choosing the Vendor. From many standpoints, the selection of the vendor is the one most important step of the entire purchase process. Yet, as Anyon and Jones point out, if the preliminaries have been taken care of adequately, the selection should be a mechanical operation.

But there are pitfalls in the economic realm that are not apparent until an extensive study has been made. Take, for instance, a proposal that goes beyond the capital investment that was originally contemplated. Say Anyon and Jones: "The real economic test of such a study is one based on an incremental economy study.

"In short, carefully examine the return on the investment over and above the original proposal. The results of such a study could differ considerably from one that takes into

THERE is a reason for the very substantial tonnage of sodium phosphates Blockson ships to industrial areas far from our greatly expanded plant facilities here in Joliet. That reason is continuous prompt shipment—a few bags or many carloads—minus the red tape usually associated with an operation as large as ours.

Again and again customers tell us they couldn't get better service if our plant were located in their own industrial community.

There is a reason for that, too. At Blockson, production and sales are so closely coordinated that a single collect phone call is all that is required to expedite your unforeseen needs and get your sodium phosphates en route the very same day if it is humanly possible, and most frequently it is.

We welcome the responsibility of functioning as an arm of our customers' production setup, minimizing their inventory and warehousing expense, timing and dovetailing dependable shipments with their own processing operations and at all times providing a uniform and dependable competitively priced product—readily available in your required granulations and specifications.

The new Blockson catalog and handbook is yours for the asking.

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- *Sodium Acid Pyrophosphate*
- *Trisodium Phosphate Chlorinated*
- *Disodium Phosphate*
  ANHYDROUS • CRYSTALLINE
- *Monosodium Phosphate*
  ANHYDROUS • MONOHYDRATE

- *Sulfuric Acid*
- *Sodium Fluoride*
- *Sodium Silicofluoride*
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account the return on the whole investment."

In the same way, a proposal could be made that would change the whole operating-expense pattern. This should be evaluated by establishing comparable data for each on a total expense estimate, then comparing the total expense associated with each proposal with the investment associated with it.

• Awarding the Contract. Most of the purchase orders in use by industry today meet the general requirements of a contract. However, there are special clauses designed to protect the buyer that you'll want to consider including in your transactions.

• Follow-up and Expediting. These two purchasing experts describe the operation at this stage as watchdogging. They suggest a method for keeping the changes posted. Also, they make the point that, by this time, you should be able to tell how well or how poorly you've handled the operation. Say they: "The emergencies, extra adjustments and headaches are largely a direct reflection of the inadequacies in planning the previous steps.

• Acceptance and Payment. The mechanics of the acceptance of equipment and payment will probably not differ significantly from the purchase of materials.

• Records. The keeping of records is important, of course, not only to smooth the purchasing operation, but to verify past purchases and to facilitate future ones. Anyon and Jones list some of the items you'll want to consider in setting up a record system.

Tuned Up For Boiling?

A skilled chemical operator, even with the "perfect pitch" of a piano tuner, can't tell too much about what's going on inside a boiling reactor by sound alone. That's the substance of a report by J. W. Westwater, A. J. Lowery, Jr. and F. S. Pramuky in *Science**. Members of the Division of Chemical Engineering at the University of Illinois, the trio did the off-beat research for the National Science Foundation.

They started out to explore the scientific foundations for the popular system (among chemical plant oper-

* Aug. 19, '55, p. 332.

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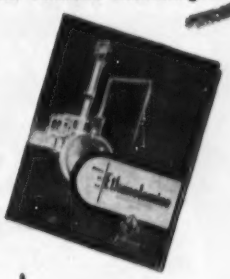

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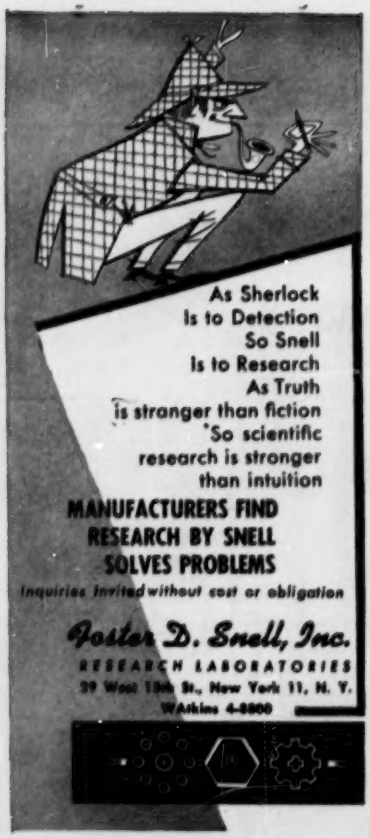

PRODUCTION . . . . . .

ators) of judging the performance of evaporators and reboilers by the noise they make.

They set up a crystal microphone 6 in. from the wall of a boiler equipped with a bayonet heater. The microphone, in turn, was mounted on a sound level meter indicating sound levels in decibels in the range of 25 to 7500 cy./sec.

They concluded: "The sound of boiling is indeed a function of the heat transfer rate during boiling but not in the way generally imagined. Contrary to popular opinion, the sound does not increase continuously with the heat flux. Inasmuch as the heat-transfer rate is a function of the temperature driving force, the sound is a function also of the temperature difference between the hot solid and the boiling liquid."

They discovered a difference in sound intensity in the three types of boiling: nucleate, transition and film. A trained listener, they feel, should be able to detect the difference between nucleate boiling and film boiling. They doubt he'd be able to classify the transition type.

Also, though they had no trouble duplicating the qualitative relationships, the results differed quantitatively from night to night. This, they suggest, may mean that the sound was influenced either by the smoothness of the surface of the heating element or by the dissolved gas content of the gas or by both.

As they point out, further tests will be needed to verify that. Meantime, they've proved again that while there may still be a place for art in chemical process plants, it's a poor substitute for science.

EQUIPMENT . . . .

Welding Update: Advances in welding titanium and molybdenum will be among the subjects of interest to the process industries under discussion at the meeting of the American Welding Society in Philadelphia next month (Oct. 17-21). Other subjects carrying significance for the industry: ap-

Silica Runs No-Obstacle Course

CLEAR-SPAN CONSTRUCTION provides an unobstructed 880-ft. route for silica refractories passing through Harbison-Walker Refractories Co.'s (Leslie, Md.) new 100,000-sq.-ft. plant. Luria Engineering Co., Inc. (Bethlehem, Pa.) built the plant of standard 60-ft. clear-span structures, modified to accommodate several elevated grinding and screening machines and one of the longest tunnel kilns (504 ft.) in the world. Lack of interior supporting columns affords optimum use of available storage, freedom of movement for handling rail-mounted equipment.

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Candy and Gum Wrappers
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Rug Bindings
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plication of welding to piping and pressure vessels; carbon dioxide-shielded metal arc welding; welding of stainless steel; new approaches to welding with continuous-fed electrodes; and how to use the new powder electrodes.

•

Coal Dryer: Dorr-Oliver Inc.'s (Stamford, Conn.) new fine coal dryer utilizes principles of fluidization to achieve rapid heat transfer, high drying capacity per unit area. This modified Dorrco FluoSolids system burns pulverized coal in the lower, nonfluidized chamber of a two-compartment reactor. Combustion gas is mixed with tempering air, passed into the upper fluidized drying section through a specially designed constriction plate. Wet coal, entering via screw conveyor, is brought up to temperature immediately by the hot gas, and the moisture is evaporated. Coarse dried product is discharged just below fluid bed level; fines are separated from exit gases by a cyclone. The unit handles as much as 200 tons/hour of ¼-in. x 0 to 1½-in. x 0 size coal, operates at around 150-160 F.

•

After-filter: Six throw-away filters are employed in the new after-filtering mechanism that Torit Mfg. Co. (St. Paul, Minn.) designed for its model 219 FM-A cyclone dust collector. Pulling 2100 cfm., the unit recirculates filtered air back to the room to prevent heat loss during cold weather. Thick pads of glass-wool insulation on the after-filter's open surfaces remove any fines that are not trapped in the 4½-cu.ft.-capacity internal reservoir.

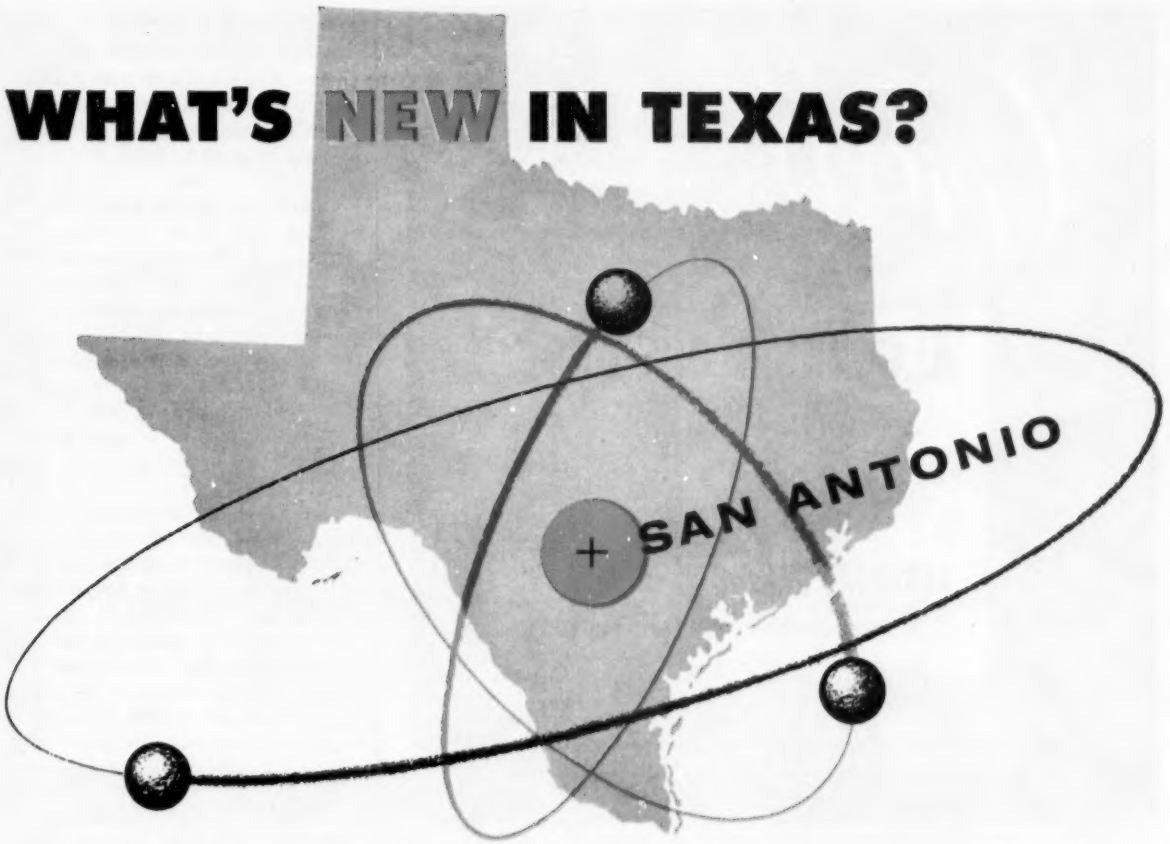
•

Constant Flow: Two electronically controlled, double-acting hydraulic cylinders enable Exline Engineering Co.'s (Tulsa, Okla.) new Model 155 flow pump to deliver smooth continuous flow at pressures to 10,000 psi. Cylinders fill and discharge alternately, assure constant rate of flow regardless of discharge pressure. Pumps offer selection of 40 outputs ranging from 10-600 cc/hour, come in monel or stainless steel for corrosive services.

•

Air Adjustment: For accurate pneumatic regulation of low-capacity flow, Milton Roy Co. (Philadelphia) now offers a controlled-volume pump with an instrument air stroke length adjustment. The unit incorporates a

WHAT'S NEW IN TEXAS?



NEW SOURCE OF Lithium CHEMICALS

Now under construction in San Antonio, Texas, the new $6,600,000 plant of American Lithium Chemicals, Incorporated, will help meet Industry's growing demand for lithium products. This new source of supply, an affiliate of American Potash & Chemical Corporation, will process high-grade lithium ores from extensive deposits in Southern Rhodesia. The initial production in San Antonio of lithium hydroxide, added to the present lithium carbonate output at Trona, California, now assures a substantial increase in domestic supply of lithia, used in its various forms in quality glassware, porcelain enamel glazes, lubricating grease, storage batteries, heat treating operations and humidity control. You can take advantage of this major step in American Potash & Chemical's program of expansion in the lithium chemical field by including this new source in your future lithium plans.

+ SAN ANTONIO CHEMICAL AND PROCESSING PLANT ASSURES SUBSTANTIAL SOURCE OF SUPPLY FOR EXPANDING INDUSTRIAL NEEDS.

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unique air servo system with feedback loop to maintain accuracy within 1%, is sensitive to changes in control air pressure as small as 1/70 psi.

•

Cold Pump: Aurora Pump Division of The New York Air Brake Co. (Aurora, Ill.) has developed its Type Z4 turbine pump for cold process applications. Suitable for handling liquid ammonia, liquefied petroleum gases, and various other chemicals, the pump features a mechanical seal in place of a conventional packing box. Pumps are available in 5- to 60-gpm. capacities for heads to 350 ft.

•

Wet Level: A hermetically sealed float level indicator for control or indication of liquid levels has just been placed on the market by Revere Corp. of America (Wallingford, Conn.). A single pole throw switch, enclosed in a nylon stem and actuated by permanent magnets imbedded in a free float, permits the F-8685 indicator to be used with solvents, oils, acids, other chemicals without exposing metal parts.

•

Dry Level: A new paddle-type bin level indicator has just been introduced by The Bin-Dicator Co. (Detroit). Dubbed Roto-Bin-Dicator, the unit employs a slowly rotating paddle, mounted on a flexible shaft, to detect presence or absence of dry material. Particularly adaptable to installations in bins under pressure or vacuum, Roto-Bin-Dicator has advantages over diaphragm-type devices in materials that tend to "bridge" or "rathole."

•

Hot Seal: Latest addition to Durametallic Corp.'s (Kalamazoo, Mich.) Dura Seal line is a new rotary mechanical seal for service at temperatures to 800 F. Furnished in balanced (Type PHU) or unbalanced (Type RHU) assembly, the unit features simplicity of design, ease of installation on new or existing equipment. Stuffing box flushings are not required except where necessary to control vapor pressures in the box or for the removal of excessive coke formation.

•

Pressure Guard: Pressure Products Industries, Inc. (Hatboro, Pa.) uses a floating piston sealed by an O-ring in its new gauge protector to check surges, prevent liquid loss at pressures to 100,000 psi.

BIG DETERGENT NEWS

Monsanto develops superior, low-dust Santomerse from new alkyl benzene

Santomerse No. 1, Monsanto's all-purpose alkyl aryl sulfonate surface active agent, is now better than ever.

Tests reveal substantial reduction in dusting. The flake is less friable, much stronger. Compounders will find this material is easy to handle and will produce an end product of excellent quality and appearance.

The improved Santomerse No. 1 is made with a new alkyl benzene developed by Monsanto, which you, too, can use to produce a better sulfonate.

The new Monsanto alkyl benzene is less color sensitive and produces a whiter sulfonate. When sulfonated, the odor level is exceptionally low. This is an important feature for manufacturers of liquid detergents.

For details of these and other Monsanto detergent products, write: MONSANTO CHEMICAL COMPANY, Inorganic Chemicals Division, 710 North Twelfth Boulevard, St. Louis 1, Missouri. *Santomerse: Reg. U. S. Pat. Off.*

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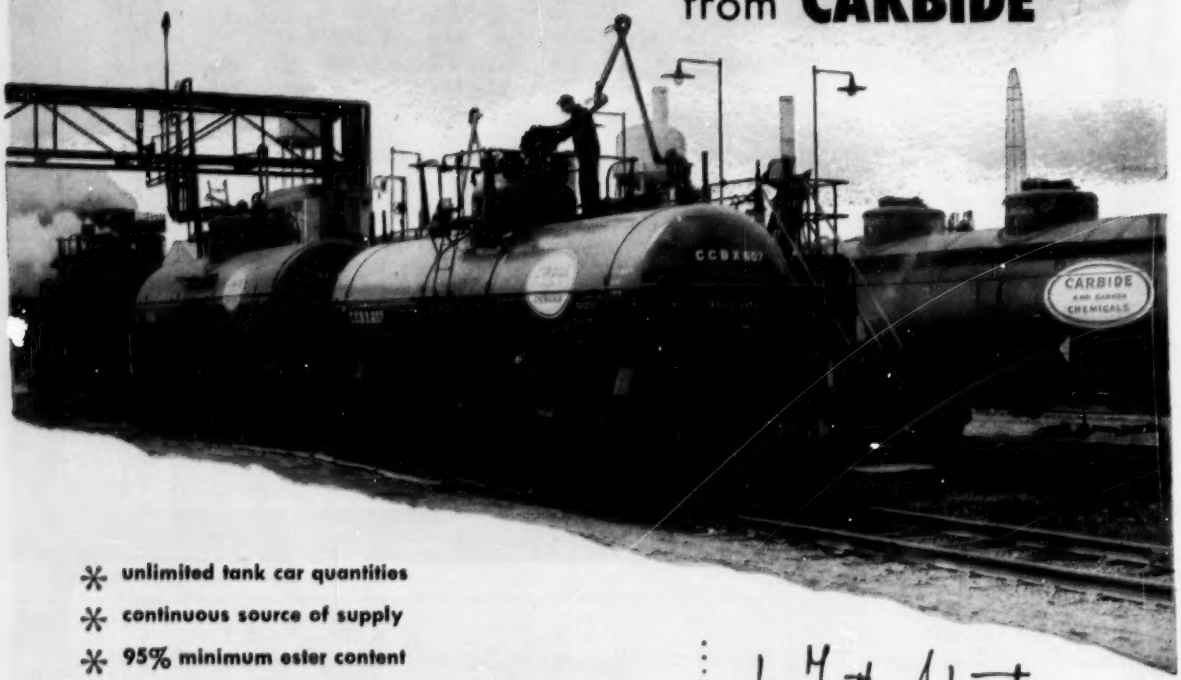
PRIMARY AMYL ACETATES

from CARBIDE



- unlimited tank car quantities
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- 95% minimum ester content

A new route to synthetic amyl acetates from CARBIDE's OXO unit, offers you a consistent, uniform product meeting rigid specifications. Primary amyl acetates is a mixture of normal amyl acetate, 2-methylbutyl acetate, and 3-methylbutyl acetate.

As a high boiling lacquer solvent, it offers: slow evaporation rate—high dilution ratio—excellent blush resistance.

Its low water solubility and narrow boiling range make it an excellent extractant for penicillin and other important antibiotics.

These general solvent properties will help you evaluate primary amyl acetates as a lacquer solvent for your formulations.

Relative Evaporation Rate (n-butyl acetate = 100)	42
Toluene Dilution Ratio	2.3
Naphtha Dilution Ratio	1.3
Blush Resistance, % R.H. at 80° F.	91

Tentative Specifications		Typical Analysis
0.873—0.879	Specific Gravity at 20/20°C.	0.8761
135—150°C.	Boiling Range at 760 mm.	140.3—148.3°C.
95% min.	Purity (ester content)	96.5%

for Further Information

on primary amyl acetates derived from OXO chemicals, call or write the nearest of CARBIDE's 25 sales offices. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

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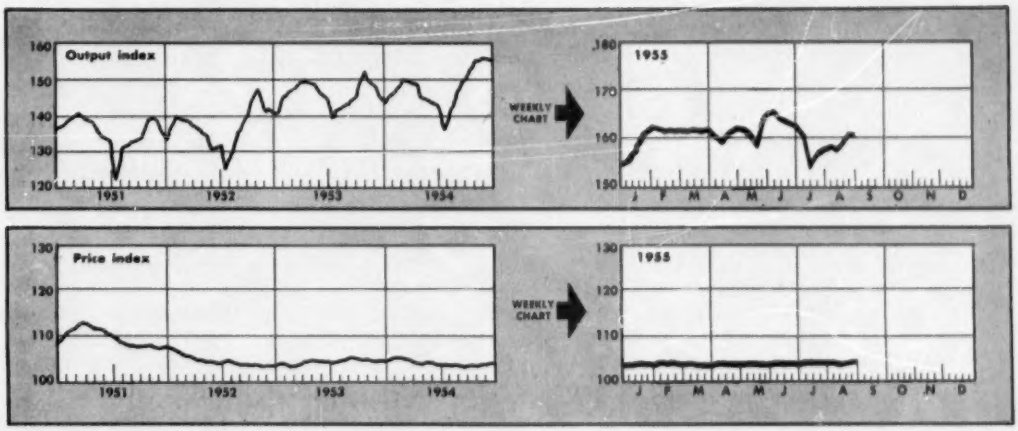
MARKETS . . . . . .



WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947-49=100)	163.1	160.8	147.4
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.6	104.5	104.2
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	480.7	470.9	311.5
MONTHLY INDICATORS—Employment (Thousands)	**Latest Month**	**Preceding Week**	**Year Ago**
All Manufacturing	13,046	13,084	12,179
Non-durable Goods	5,487	5,453	5,303
Chemical and Allied Products	540	545	517

MARKET LETTER

Headaches ahead? Some may well be in store for insecticide and herbicide producers. And it's a recurring fall complaint. While business is still fairly good in a few areas, trade observers are charting a definite decline in consumption of most bug and weed killers.

With the easing in demand, prices, especially for insecticides, are expected to suffer some post-season shaving—an unhappy contrast with the not-too-long-ago firmness displayed by just about all the large-volume items including DDT and BHC.

•

Fulfilled was the prediction here *(CW Market Letter, Sept. 3)* that chlorine would be touched by the current wave of price increases. On the first of next month, it's likely that just about all contract customers will be paying more for their needs; already some spot sales are being made at a higher price.

Columbia-Southern was first last week to post a liquid chlorine hike ($2/ton, immediately on spot, Oct. 1, on contract); shortly afterward, Pennsalt upped its cylinder prices.

•

Caustic soda and soda ash movement will continue to accelerate between now and the end of the month. Why? Customers, as expected, are—and will be—placing heavier orders to beat the higher-price Oct. 1 deadline.

The supply-stocking now, however, may well presage a definite slowdown in buying, at least for some weeks after the increases go into effect.

Look for a general boost in sodium silicofluoride tags. Producers report a strained supply situation that isn't likely to ease soon. Behind the pinch: expanding drinking-water-fluoridation programs; increasing demand from other industrial outlets.

Already, customers shopping around in the resale market are said to be paying premiums considerably higher than manufacturers' 7-8¢/lb., l.c.l., works, schedules. And at that, there are only odd lots available.

•

There's plenty of polyethylene glycols and ethylene amines available, but Carbide and Carbon's customers are going to pay slightly more for less-than-tank-car quantities. Higher cost of drums is behind the ½¢/lb. increase in c.l. and l.c.l. prices on diethylene amine, triethylene tetramine and tetraethylene pentamine.

Three grades of polyethylene glycol (Carbide's Carbowax) are up ¼¢/lb. on the same basis. Tank prices on both groups remain unchanged.

Carbide will also bill future shipments of its butyl Carbitol on a delivered (rather than the previous f.o.b. works) basis. As a result, prices will go up; for example, to 28¼¢/lb. (tanks) from the former 27¢. The move swings this material into line; all other glycol ethers have been on a delivered schedule.

•

The dragged-out strikes that have hampered Florida's phosphate rock industry continue to pinch availability of high-grade rock. This, together with higher labor and power costs, is why, says one producer, phosphoric acid and several phosphate chemical prices are going up next month. Food-grade acid (75%, 85%) will be up 25¢/cwt; the 80%, 31¢/cwt.

Some of the phosphates to be raised on Oct. 1: mono-, di-, and tricalcium; duo hydrate and mono- and diammonium; sodium acid pyro.

•

Surprisingly, schedules for sodium tripolyphosphate and tetra sodiumpyrophosphate, important detergent materials, will not be increased at this time, although identical cost price pressures apply. Most makers insist that the slashes earlier this year (*CW Market Letter, March 12*) were too deep, that a boost now would be justified.

But likely to forestall any hikes—until next year, at any rate—are a few long-term contracts tightly binding some producers to current prices. Another effective price-reiner: expanding U. S. production.

•

Copper users have no word yet on whether the President will accede to a frantic appeal made last week that upwards of 100,000 tons be released from the national stockpile.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending September 12, 1955

UP

	Change	New Price		Change	New Price
Ammonium phosphate, monobasic, c.l., wks., frt. equald., 100 lbs.	$0.35	$ 9.00	Phosphoric acid, food grade, 75%, tks., wks., 100 lbs.	$ 0.25	$ 5.35
dibasic, c.l., wks., frt. equald., 100 lbs.	0.35	9.00	food grade, 80%, tks., wks., 100 lbs.	0.31	5.75
Chlorine, liq., tks., short ton	2.40	61.00	NF, 85%, tks., wks., 100 lbs.	0.25	6.40
Chlorine, liq., cyls., c.l., works, frt. equald.	0.0075	.1025	Sodium orthosilicate, anhyd., dms., c.l., wks., 100 lbs.	0.30	6.30

All prices per pound unless quantity is stated.

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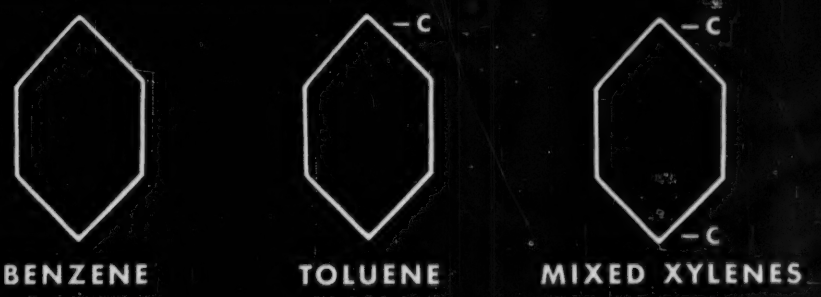

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SUNAPTIC ACIDS (high molecular weight naphthenic acids)

SULFONATE WS (water soluble sulfonate)

PDO-40 (polymerized drying oil)

SUN OIL COMPANY SETS NEW HIGH STANDARDS IN PETROCHEMICALS

Constantly growing demand for purer petrochemicals met by new Sun Oil petrochemical plants

Chemists and manufacturers are constantly searching for chemical raw materials that will bring higher yields... increased plant efficiency... better quality in finished products.

Sun Oil Company is satisfying this demand with their new petrochemical plants, which are among the largest and most modern in the country.

Today Sun's plants are producing petrochemicals unsurpassed in purity and quality. Typical are Sun Toluenes, which are guaranteed to contain less than 0.5% paraffins, well below the ASTM maximum of 1.5%.

Butylenes are eliminated from Sun Oil's propylene polymers. Sunaptic acids are saving thousands of dollars when used as a replacement for oleic acids, commercial naphthenic acids and synthetic acids in corrosion inhibitors for oil well casings and oil pipelines.

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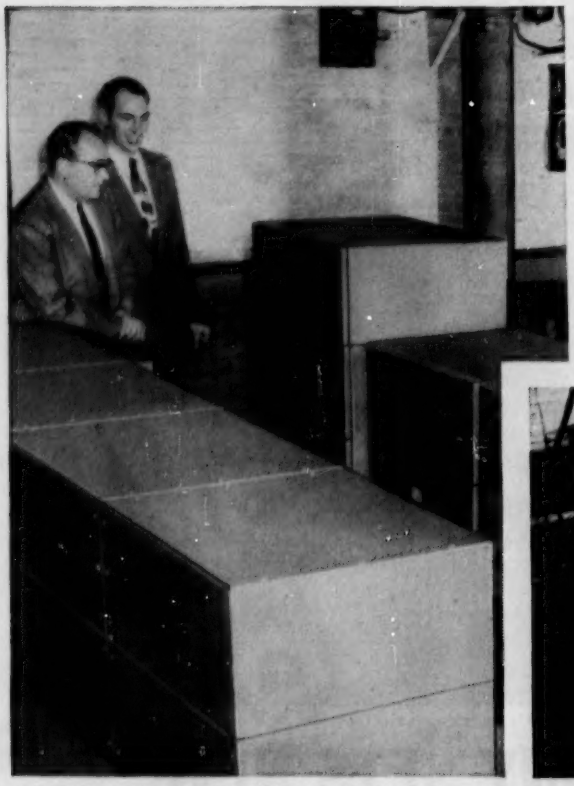
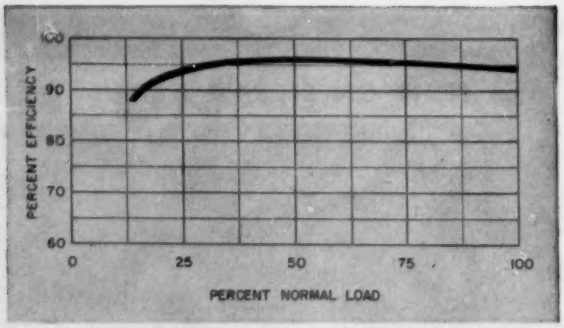
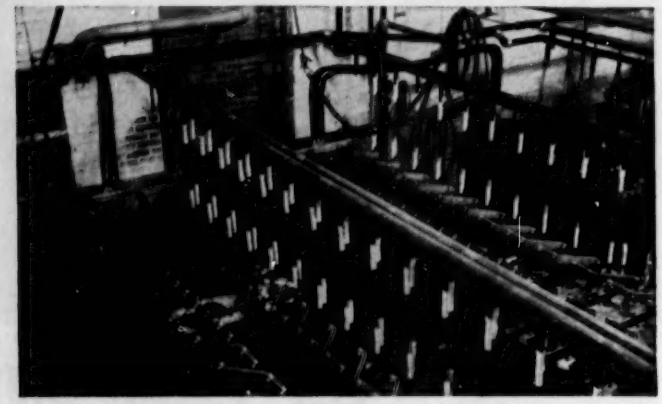




CONVERSION EFFICIENCY of a 25-kw germanium power supply is better than 94 per cent at full load.



THE SIX 25-KW GERMANIUM RECTIFIERS shown above are rated 1200 amperes, 125 volts d-c maximum, and are supplying power to the line of hydrogen-oxygen cells shown on the right. Lower cell-room voltages mean safer working conditions.

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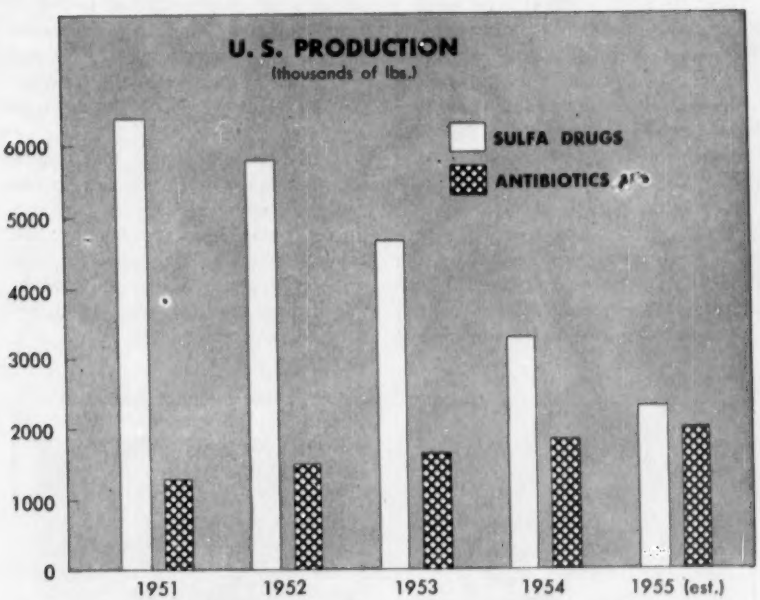

ANTIBIOTIC OUTPUT, once relatively small compared with sulfonamide production, will this year come close to matching the sulfa rate.

No Drug on the Market

Within the next three months or so, it should be clearly evident that the production picture of the once-tabbed "miracle" drugs will have undergone a long-coming change—antibiotics will just about match the sulfonamides in volume of output. The '55 estimated score: about 2.3 million lbs. of sulfas vs some 2.0 million lbs. of antibiotics for human and veterinary use. Add, too, perhaps an additional 600-700,000 lbs. of the latter for animal feed supplements.

Actually, antibiotics,* as a group, has headed the list of important medicinals (in terms of value, at least) since the Korean period. Latest full-year statistics (for '54) issued by the government indicate that sales for medicinal purposes were valued at $240 million—a sizable $9-million increase over the previous year's $231 million, despite a drop-off—from 1.5 million to 1.3 million—in pounds sold.

Production in the U.S., though, continues to step ahead. Last year, for example, output hit 1.8 million lbs., some 207,000 more than in '53. And, if the present rate holds, this year, as stated, will likely break through the 2-million-lbs./year mark. Compare that with the 853,000 lbs. produced in 1950.

Up and Over: This startling growth of antibiotics has been chiefly at the expense of the sulfa group. More potent, gram for gram, the former, beginning with penicillin, early usurped the "wonder" label among drugs.

War needs, too, helped nudge antibiotic productive facilities to today's acknowledged overexpanded state. Early in the Korean emergency period, the U.S. recognized that antibiotic expansion was necessary, stepped in with aid to establish plants for the production of streptomycin and penicillin, among others. In mid-'52, for example, a penicillin capacity goal—600 trillion units/year—was set, with a January 1, 1955, target date, by the then-operating Defense Production Administration.

This was achieved, and process development has further increased production for many companies. At the moment, slightly more than 75% of this country's penicillin capacity is being used, and chances are slim that the rate will be increased to any great extent during the remainder of this year.

The fact is, in contrast with 1954's 22% jump over '53, few expect total penicillin salts production to tilt upward more than 5% in '55, perhaps even less next year. That would indicate that penicillin output this year will be approximately 475 trillion units; by '56, something under 490 trillion.

But even this slight increase may bring with it a further decline in penicillin's sales value. And it's dropped dramatically since production first began to outrun demand. For instance, overproduction which, a few years ago, brought about a near-market glut and, concomitantly, some sharp price-cutting, helped push the value of penicillin sales down to about $53 million in '54, from 1951's big $137.5 million.

Export Expunge: A similar pattern exists in penicillin's export picture. Since '51, particularly, quantity shipped abroad has risen steadily, while price has plummeted. Note these four-year extremes: In 1951, about 84 trillion units of penicillin were exported—dollar value, about 48 million; last year, almost 124 trillion units shipped; the value: about $16.7 million.

Despite the trend toward expansion of health programs in foreign countries (which to date has meant a stepped-up demand here), outlook for U.S. shipments abroad may well be growing dimmer.

Penicillin exports, aver many, will not increase as rapidly during the next few years as they have in the past. Reason is elementary: Increased production in Western Europe and Japan, plus mushrooming of new plants† in many other areas of the world (e.g., Argentina, Brazil, Chile, India, the Philippines) will slice the need for antibiotics produced in this country.

The same can be said, of course, though perhaps less emphatically, about the prospects for many other antibiotics besides penicillin. Note that in the first four months of this year exports of streptomycin, dihydro-

* There are 16 recognizable mass-produced antibiotics. The U.S. Tariff Commission lists specific figures on five: penicillin, streptomycin, dihydrostreptomycin, bacitracin and, starting in 1954, neomycin. Of the remaining 11, five are widely known: Aureomycin (Lederle), Terramycin (Pfizer), Chloromycetin (Parke-Davis), erythromycin (Abbott, Pfizer, Upjohn), tetracycline (Bristol Labs, Lederle, Pfizer, Squibb, Upjohn). The others: actinomycin, polymyxin, viomycin, tyrothricin, fumagillin, and nystatin.

† One such: Europe's new—and first—Terramycin plant. It's French-American, located near Paris; is the result of a partnership formed by Chas. Pfizer & Co. of Brooklyn, and Clin-Comer, French pharmaceutical house. Initial Terramycin capacity: 500-1,000 kilos/month. Plant will also turn out other antibiotics, hormones and vitamins.

streptomycin, bacitracin and several other antibiotics (lumped by government statisticians, in an "all other" category) showed a decided decline from shipments made during the same period in '54.

The downtrend is expected to reverse itself on several of the broad-spectrum antibiotics. But should this not occur, a number of U.S. firms need not dip too deeply into the red ink. In many cases, production units in place or going up abroad are actually subsidiaries of American companies. Too, some manufacturers have established facilities for finishing operations so that material is shipped from these shores in bulk and repackaged or finished in other countries. Result: a substantial cutting in costs, as well as a means of maintaining a deep-dug toehold on foreign markets.

Balance for the Future: But whatever loss may be incurred by falling exports could well be more than made up by some bound-to-expand newer outlets right here in the U.S. In the opinion of some market probers, the future of antibiotics may lie as much as 90% in nonpharmaceutical uses. A revolutionary change in thinking, indeed, when one recalls that less than a decade ago these materials were considered exclusively medicinal products.

Fields where antibiotics show definite promise include: stimulation of plant, animal, and poultry growth; plant disease control, especially in the use of antibiotic sprays for use on orchard crops; industrial (fermentation, mould, bacterial growth inhibitor); preservation of fish, meat, and fresh vegetables. (The latter though, although extensively tested by many companies, is still ruled out by the Food & Drug Administration.)

Already some antibiotic sprays for plant disease control—Pfizer's streptomycin-oxytetracycline compound, Agrimycin, and Merck's straight streptomycin Agristrep, and Upjohn's cycloheximide, Acti-dione—are on the brink of wide-scale commercialization.

One factor that will likely generate a hefty nudge for greater use of streptomycin in these outlets is a lower price.

Until recently, the material was considered too costly for such uses, but nonmedicinal streptomycin, like other grades, has dropped. The reduction: from more than $2/gram in '46 to a current manufacturers' price of about 9¢/gram in most areas.

Millions of dollars have been saved, of course, through control with antibiotics of infectious diseases in farm animals, but still greater potentials are foreseen by use of the drugs as a feed supplement. If the past is any indication, this field will continue to show the greatest growth in the antibiotic market.

First used for this purpose during 1950, antibiotic sales to animal feed supplement manufacturers have literally ballooned, until today a near-30% of all antibiotics marketed is fed to farm animals. Note this impressive progression of sales for 1952, '53, and '54: 172,000 lbs.; 391,000 lbs.; 562,000 lbs. And there's no slowdown in sight.

Thus it would appear that despite the industry's overproduction, overcapacity, skittering exports and cut-throat competition, antibiotics will continue over the long-range to forge stubbornly ahead. And in the process, they'll drop their "wonder" label, become staple commodities.

World's Biggest Bull

VISITORS to Kansas City, Mo., will note a startling plastic-wrought change in the city's skyline—a three-times life-size, internally lighted replica of a Hereford bull mounted on a 90-ft. pylon.

Fabricated of translucent glass-fiber-reinforced polyester, the three-ton red and white bull serves as an identification device at the new national headquarters of the American Hereford Assn. (*see cut*).

The skin alone weighs about 1,000 lbs. and is made from an ultra-violet light-resistant resin in Rohm & Haas's polyester series.

Atomic Market

Companies interested in expanding into high-purity zirconium production will soon have a ready-made outlet. As indicated earlier (*CW Market Letter, Sept. 3*), the Atomic Energy Commission will be shopping for 2 million lbs. of the metal. Reason: the push in the government's atomic reactor program—especially for reactors to power submarines.

At the moment, the AEC is buying some 200,000 lbs./year from Carborundum Metals (Akron, N. Y.) for use as a structural material in reactors, but the Commission in November will formally ask potential producers to submit proposals by next February. The new procurement will be in addition to the amount now being purchased from Carborundum.

Pertinent AEC advice, however, is that prospective bidders become familiar with zirconium technology as soon as possible; for a prime part of production technic concerns separation from zirconium of the hafnium metal that is concurrently present. The separation is ticklish, cautions the commission, since both metals undergo similar chemical reactions.

The agency will consider proposals on any production process—as long as end-product specifications are met. Schedules may be obtained from AEC's Pittsburgh Area Office.

Not only would AEC buy zirconium, but it would also be interested in purchasing the hafnium metal—the latter may find use in shielding or controlling atomic reactions. And there's an additional possible industrial use: hafnium carbide is considered a promising supplement to other metal carbides used in cutting tools.

First deliveries of the soon-vital metals should be made by July, 1957, and the commission would be agreeable to signing contracts for shipments over either a three- or a five-year period. The amounts: 1.2 million lbs. over the shorter time; the 2 million over a span of five years.

Venturesome zirconium - hafnium marketers, points out the AEC, may also expect a broadening commercial demand for these metals as more private companies begin constructing their own atomic reactors. The agency flatly states that it does not intend to provide either metal for such projects.

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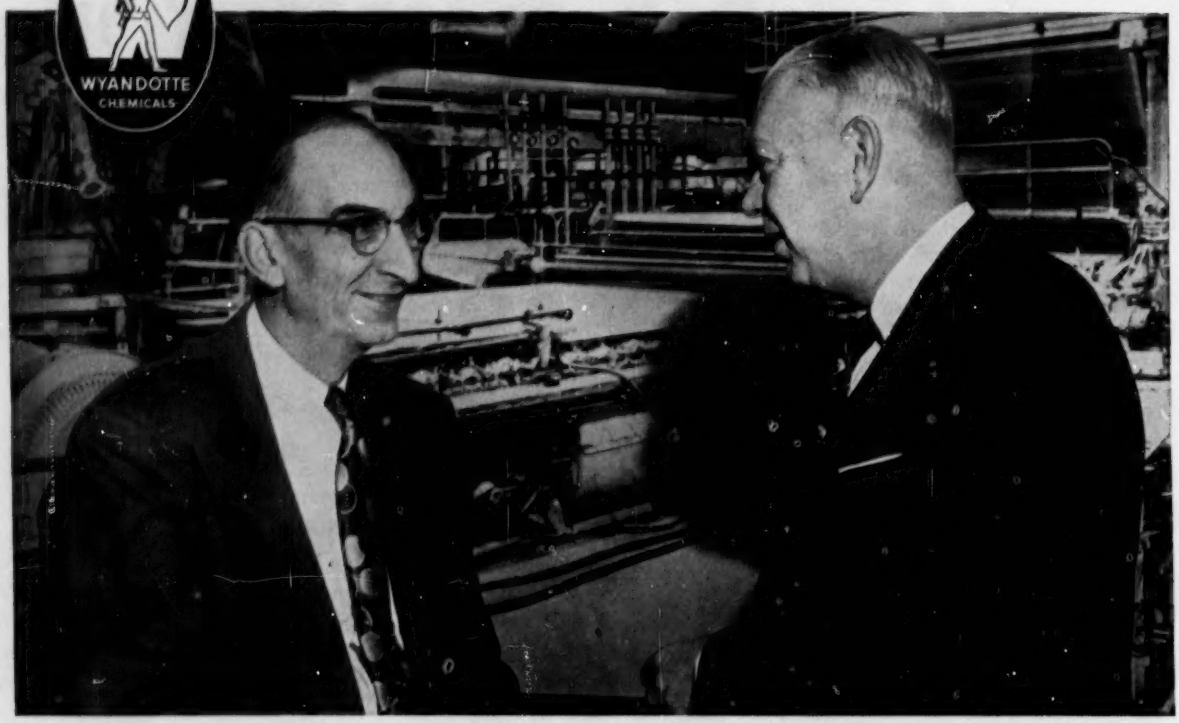

Discussing new product developments are: K. F. Speelman (left), director of purchases for Minnesota and Ontario Paper Company, and W. H. Schlafge, general manager of the company's International Falls Division.

"Our working experience with Wyandotte has proved excellent"

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From a small beginning, the Minnesota and Ontario Paper Company, Minneapolis, Minn., has progressed to a modern, diversified manufacturing enterprise.

Today, it produces a significant volume of newsprint, upwards of 50 kinds and grades of chemical and groundwood papers, a complete line of structural, decorative and insulating boards. In addition, the company produces and treats telephone poles, railroad ties, lumber and posts. And – since it uses about six-million trees yearly to make its various products – it conducts an extensive forest-management program.

In speaking of purchasing for this vast enterprise, K. F. Speelman, Director of Purchases, says: "The very existence of a company of such magnitude – to say nothing of the well-being of its many employees – depends in a great measure on sound purchasing practices. Therefore, it is absolutely essential that we, who make the purchases, have on tap a vast number of suppliers of all kinds of commodities.

"What's more, it is necessary to know something about the vendors themselves – their ability to fill orders accurately and promptly, and their reputation for backing up their products. Our working experience with Wyandotte Chemicals has proved that it is an excellent source for Soda Ash, Liquid Chlorine and Liquid Caustic."

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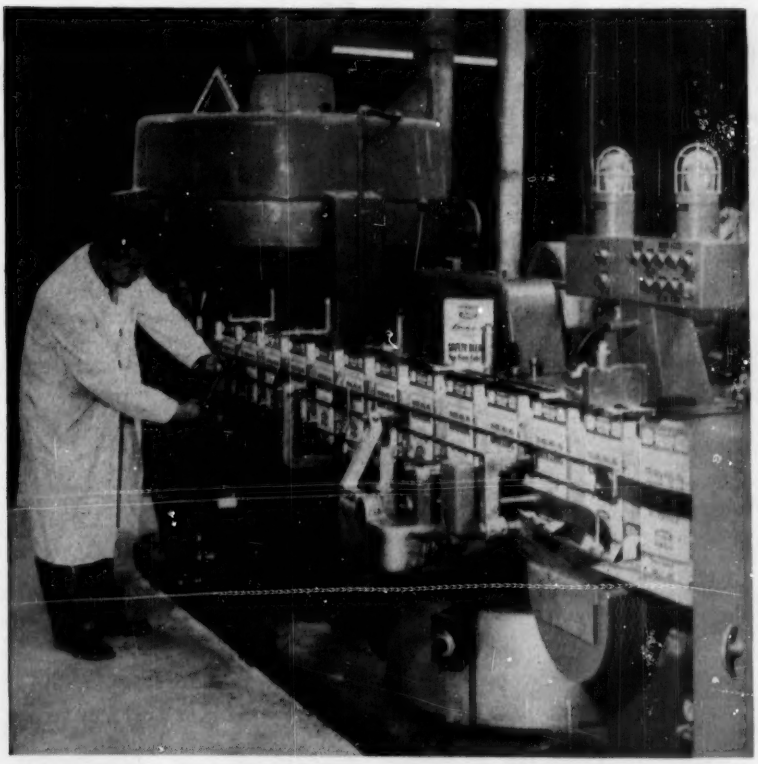

300 BOXES A MINUTE: For the careful housewife, it now takes two bleaches.

Mild Boom in Mild Bleaches

Relegated to a side ring in the home laundry bleach three-ring circus,* the light duty powdered bleaches are slowly but firmly building a market. Although at a recent trade show the Gold Seal Co. (Bismark, N.D.) claimed sales of $1.2 million for its Snowy brand light duty last year, overall sales of these bleaches have not been spectacular.

But if it hasn't been a get-rich-quick business, it looks as though it will have a long run. As one bleach maker (who makes both a light and heavy duty powder) last week defined the market, it will become a staple for the "fancy housewife, the kind who buys both Tide and Vel."

* In the center ring right now: the new heavy-duty powders, with chief interest in the recent shift from calcium hypochlorite to Halane (*CW, Aug. 13, p. 58*). There might possibly be another heavy-duty shift coming—to lithium hypochlorite. Foote Mineral Co. (Philadelphia) is in a "semi-pilot-plant" stage of production now, hopes soon to have the lithium compound commercially available to bleach makers. Claimed for it: bleaching properties as good as calcium hypochlorite, much greater solubility in water, not much greater price.

And they are mild: When the light-duties were new in 1949 they were the only powder, had all of powder's advantages over the liquids (ease of handling, light-weight packages). Since the introduction of heavy-duties in dry form also, however, the mild bleaches are held to the jobs they do best—limited action bleaching on nylon, wool, silk, rayon.

But, in spite of their limitations, these bleaches—basically sodium perborate—are now the biggest users of that compound—about 7 million lbs/year. Before the home laundry product most perborate was used as an oxidizing agent following vat dying of textiles. A little was used in the manufacture of cleaners for false teeth. These uses now account for 6 million lbs./year; scouring cleansers (Ajax, Babo, Old Dutch) take 5 million; home laundry products use 7 million.

There are two perborate suppliers: DuPont has been making perborate since 1936; the Becco Chemical Div., Food Machinery and Chemical Corp. (Buffalo, N. Y.) has been making it for the past eight years.

The usual box of light duty bleach is made up from sodium perborate (a little less than half), synthetic detergent, poly phosphates (20-40%), silicates, sodium sulfate, optical brighteners, and perfume. Most of them are spray-dried, half by Theobald Industries (Kearny, N. J.). The active ingredient, sodium perborate, contains about 10% oxygen, which it releases for bleaching by forming hydrogen peroxide.

A Godfrey Friend: In a business still heavy with regional brands (because of transportation costs most liquid bleach making was on a local basis; now many of these organizations are making dry bleaches) clear cut national sales patterns don't appear. Becco believes that Gold Seal's Snowy is the number-one seller.

Now approaching the bleach business with the same "siege-gun" sales tactics as it did with its successful Glass Wax, Gold Seal is spending $1 million/year on TV (Arthur Godfrey, Jo Stafford, Perry Como), magazine and newspaper advertising.

Among the leading competing brands are Purex (Purex Corp., Southgate, Calif.); Sage Safety Bleach (Sage Labs, New York); Dexol; Vano (Vano Products, Oakland Calif.); DuPont's All Fabric; Hi-Lex (Hilex Co., Inc., St. Paul, Minn.).

In general the perborate bleaches' advantages—mild action, harmlessness to fabrics, usability on fabrics which can't take chlorine bleaches—bring this disadvantage: they don't bleach very much. Repeated use is necessary before a change can be seen in the fabric. On cottons, perborate is nearly useless. For plain results on any textile it is necessary to use near boiling water—which American housewives aren't in the habit of doing.

Boiling Bleach: It is for this last reason that in Europe—where boiling clothes is the rule—perborates have a much bigger sales impact than here. It isn't uncommon for perborate to be included in French and English detergents. (In these countries washings are farther apart and a heavier duty detergent is desired, which usually means putting in a bleach). For a time one of

the most popular French "detergents" was actually a perborate which cleaned by bleaching.

Although customary low washing temperatures will probably keep perborate from being a significant ingredient in American detergents, there is some possibility that it may get a big gimmick play. Proctor & Gamble are now test-marketing an Oxydol containing 5% perborate (0.5% available oxygen).

Feeling among perborate men is that there is little likelihood that enough perborate will be added to any U.S. detergents to really create a bleaching effect (2-3% available oxygen is generally considered a minimum), chiefly because of the cost factor. With perborate at 18¢/lb. against detergent's cost of around 5¢/lb., not much can be added without getting a higher retail price than the competition.

Figures one bleach maker: "Perborate in detergents is going to be like chlorophyll in tooth paste." And everyone knows what that was like.

ALPCO's GERSTIN AND CHRISTIE: Casting Polyrubber in many roles.

Lots More Than Bounce

Versatile in application, simple to mold, inexpensive to put into production, a new elastomeric molding compound is being introduced by American Latex Products Corp. (Hawthorne, Calif.) this week. Polyrubber, as the new material (CW, June 4, Newsletter) has been tradenamed, has already filled a few special jobs. But ALPCO feels they only hint at the broad product range for which their material is suited.

Here are a few of the current and planned Polyrubber products, with some of the reasons it qualifies for them:

• Aircraft fuel tank seals. A polyester compound*, Polyrubber has shown resistance to aromatic fuels, solvents, mould, dilute acids. It remains flexible over a wide temperature range (—40F to +300F), and resists oxidation. Gaskets, too, for engines and airframes, can be made from the compounds.

• Protective coating for ocean-going vessels. Sunlight and salt water resistant, it can serve as a deck covering (it is said to be highly abrasion resistant, too; and can be

* ALPCO says it can't patent its new material, so it is exceedingly sketchy in describing its composition: "A polyester resin base to which an isocyanate catalyst and a curing agent are added."

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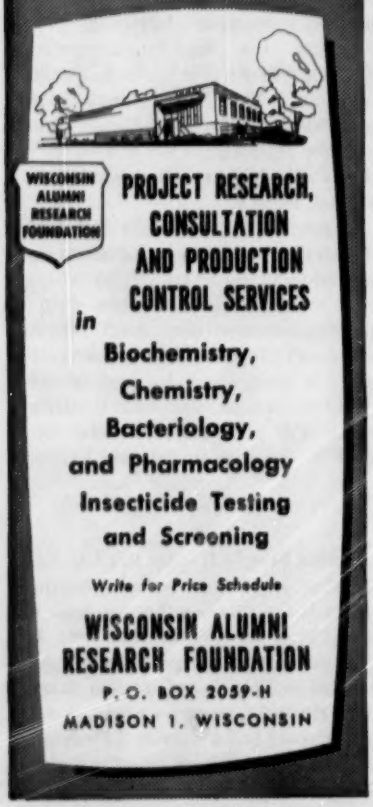

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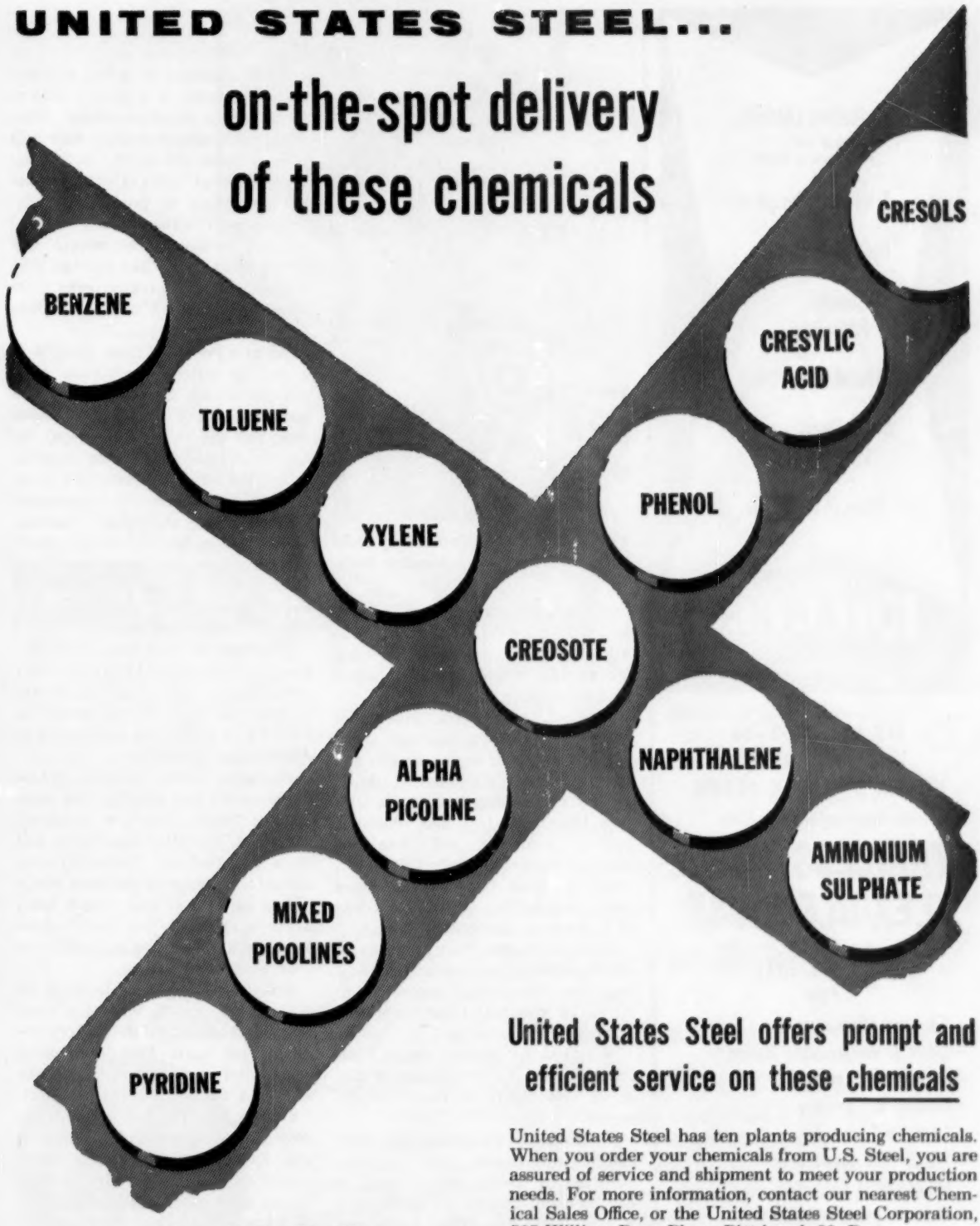

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A NEW MOTION PICTURE, "The Waiting Harvest," tells the complete story of the participation of U.S. Steel in the field of chemicals. It is available on request in 16 or 35 mm film from Film Distribution Center, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

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TANK SEAL: Simple wooden mold puts Polyrubber on production basis.

made antislip). Simply handled, adherent to many surfaces, it serves as a caulking compound, or in other applications where brine resistance counts, ALPCO says.

• Vibration dampers. Ability of the rubber-like foam to absorb shock suggests its use in engine mounts and the like, particularly where it can be molded as an integral part of a unit.

• Hose linings. The chemical process industries will note the chemical resistance of the Polyrubber, which qualifies it, American Latex says, for lining salt water pipes, even high pressure sandblasting hoses.

Cinch to Handle: Fully as important as Polyrubber's chemical and physical resistance properties, according to ALPCO's president Clowes Christie, are two other qualities.

• It can be molded simply, and cures rapidly (in 15 minutes at 225 F, in four hours at room temperature).

• Its density, elongation, and color can be easily varied.

Mixed by spatula for lab runs, it can be easily adapted for mechanical mixing. Soft, open-celled foams can be formed (density 3 lb./cu.ft., and with sponge-like qualities if desired), as well as hard, non-absorptive materials with densities up to 53 lb./cu. ft. Elongation can be virtually nil, or as much as 300%.

Mold forms can be made of almost anything—hardwood and aluminum are two examples of easily fabricated materials. Where it is desired, such as in an integral vibration damper, Polyrubber will adhere strongly with help of a material like ALPCO's Stabond #C series of primers. (Polyrubber sticks strongly to pre-formed Polyrubber parts without use of special bonding agents or equipment.) Use of a parting agent (like Stabond #3) insures easy mold release even from knurled or straited molds, the firm says.

All at a Price: All these qualities in a molding material don't come without a price tag. Christie and his vice president, Harry Gerstin, feel, however, that the $4.50/lb (average) tag for their just-in-production material is not too far out of line with other available elastomers (uncompounded natural rubber at 45¢/lb; synthetic at 80¢). Finished Polyrubber products, they say, cost little more than other types because of savings in designs, labor and equipment (extruding presses and molds).

To obtain the wide range of properties for its material ALPCO will carry several stock grades of mold materials. A firm can keep several grades on hand for as long as six months before deterioration takes place.

Overnight Service: Pointing up how the product's easy handling can mean savings: North American Aviation's Columbus, O., plant required a seal for a wing fuel cell. Synthetic rubber seemed first choice for the piece, which had to be 11 feet long, 1-inch wide, 3/16 inch thick. But tool makers wanted $2000 for dies and estimated 8-10 week delivery time.

American Latex went to work on the problem, rapidly devised a wood die and a special Polyrubber composition (*see cut*). First seals were poured and on the way to Columbus within 24 hours of the first contact.

Coming Up: The firm can point to several other examples of where ease and speed of manufacture have scored for Polyrubber. But it feels that in most cases, superior qualities of the polyester alone will give it the edge.

ALPCO sees such future applications as coating paint booths, flooring and decking, transmission belts, lining for bath tubs, appliance (e.g. washing machines) linings, sink tops, swimming pool walkways.

Moreover, Gerstin counts on a

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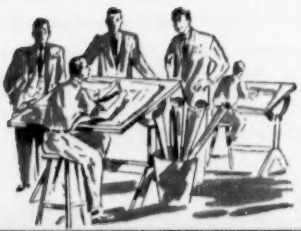

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rapid cost drop as production increases. He points out that in two years, ALPCO Stayfoam (an isocyanate foam developed by Lockheed) has plummeted in price from $12/lb. to $2.70/lb., and he believes the same will happen with Polyrubber.

Whatever the pricing situation be, ALPCO figures there is a big future for its Polyrubber. The firm has a headstart over competitors now (the product is a virtual exclusive), and it believes its experience and knowhow will let it maintain its advantage in polyester molding compounds.

Polishes by Pushbutton

With a ribbon cutting ceremony by California's Gov. Goodwin Knight, R. M. Hollingshead Corp. last week officially opened its Western Division plant in Sunnyvale. Coinciding with the dedication of the $1.3-million, 60,000-sq.-ft. plant, Hollingshead kicked off a new floor polish called Floor Show, which is a nonwax product.

Prime feature of the new facilities, which the firm actually put into operation last spring, is pushbutton production. The firm's line of maintenance compounds, polishes, and auto specialties are turned out on virtually automatic lines. Currently, only about 40 of the company's 300 products are being made at Sunnyvale, although the full list will be produced eventually. The plant can turn out an estimated 1.5 million gals. of supplies yearly.

Floor Show, the new household specialty, is priced higher than many competitive floor care treatments. Hollingshead has tagged a pint can at 89¢, sells the quarts for $1.49. Already consumer-tested in some areas, the patent-applied-for product has so far shown sales that "far exceeded our highest expectations."

Systemic Allowed

First systemic insecticide to get Food and Drug Administration tolerance okay under the Miller amendment is Pittsburgh Coke and Chemical Corp.'s Systox.

The FDA last week set the maximum residue of 0.75 parts per million for the anticholinesterase pesticide on food crops including apples, broccoli,

Brussels sprouts, cabbage, cauliflower, muskmelons, oranges, pears, potatoes, strawberries and walnuts (in addition to cotton, greenhouse flowers and ornamental plants).

The 0.75 tolerance is considered a low one—and was purposely set so at this time by the agency because of the material's toxic nature. In its establishment of the tolerance, the FDA gives any party that might be adversely affected 30 days in which to file objections or ask for a public hearing.

•

Cedar Coat: A special finish for cedar chests has been worked out by Ernest Crocker (Belmont, Mass.) for the Lane Co., Inc. (Altavista, Va.) (U.S. Pat. 2,716,621). The coating, of unplasticized chlorinated rubber, is said to permit passage of the cedar aroma.

•

Second Look: South Carolina's Supreme Court will take a second look at the states "fair trade" act. In July, County Judge Legare Bates ruled the law unconstitutional; last month the ruling was appealed to the higher body.

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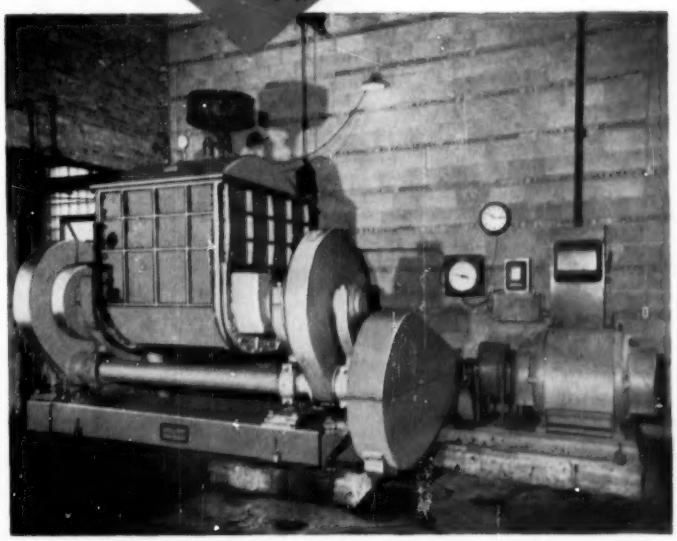

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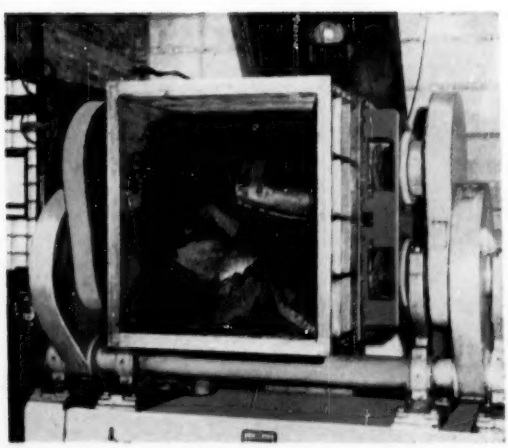

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